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GEOGRAPHICAL NOTES IN ALASKA.

BY

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At the last session of Congress the U. S. Geological Survey was required to report upon the resources in gold and coal of the Territory of Alaska, and a sum of five thousand dollars was appropriated for the necessary fieldwork. Dr. Geo. F. Becker was appointed to take charge of the party and report upon the subject of gold-mining, and the writer to investigate the deposits of coal and lignite. As the means provided and the time available were both so restricted as to render a visit to the Yukon placer mines impracticable, our investigations were necessarily confined to the coast, where nearly all the deposits of gold or coal, other than placers, are accessible by ordinary steamers or vessels specially chartered.

Our party, completed by the addition of Mr. C. W. Purington of the Survey, left Tacoma, Wash., by the semi-monthly steamer on the 23d of May, reaching Sitka about a week later. Here by the courtesy of the Navy Department, the U. S. S. *Pinta* was placed at our service for work in the Alexander Archipelago. A month was spent here, and then the party sailed on the steamer *Dora*, which carries the mail westward to Unalashka once a month during the summer. Leaving the *Dora* at St. Paul, Kadiak Island, a small steam-tug of about 11 tons net burden was chartered for work among the Kadiak Islands, in Cook's Inlet, on the south shore of Aliaska peninsula, and westward to Sand Point, in the Shumagin

* Published by permission of the Director of the Survey.

group; where we met the *Dora* on her August trip and were carried by her to Unalashka. Here a short trip was made to the Gre-wingk and Bogosloff volcano islands and return, and leaving Unalashka by the steamer *Bertha* we returned direct to San Francisco.

The geological and economic data obtained will appear in the publications of the Survey, but many years' work on a reconnaissance of this coast under the auspices of the Coast Survey has led me to the habit of noting such geographical data as seem new or interesting. Such notes made on the voyage form the basis of the present paper.

The Coast Survey, in connection with the demands of the boundary commission, has been engaged for some years in a reconnaissance of the coast and islands of southeastern Alaska, to the great amelioration of the charts of that region. During the summer tourist steamers visit the principal points of interest, and consequently the scenery and even the geography of the wonderful fiords, glaciers and mountains of the Alexander Archipelago have become pretty well known, and are described in numerous books of travel. For the explorer in search of new material, other than minor detail, opportunity begins with the voyage to the westward. The *Dora* is a sufficiently comfortable little boat and puts into a multitude of rarely-visited harbors, trading posts and passages, offering to the tourist who is not a victim of sea-sickness exceptional advantages. Yet I believe, so far, she has never had a passenger except those whose impelling motive was commercial or government business.

On leaving Sitka the mail-boat proceeds to the northwest through the narrow Olga Strait and Neva Passage, bordered by picturesque green islands densely wooded with spruce, the forest broken here and there by brooks and water-falls. The Pacific is reached through Salisbury Sound, whose shores, especially to the north, are remarkably high and precipitous. Here navigators must be on their guard against the so-called "woollies," sudden gusts diverted by the cliffs from the upper currents of air, and which descend with great force for a few moments, tearing up the surface of the sea until it is white as wool, whence the name, and are liable to capsize even good-sized vessels if not securely ballasted. These gusts often come down without warning, in fair weather, when it may even be calm at the sea-level, and are justly dreaded by seamen.

The seaward shores of the archipelago, north of Salisbury Sound, are little known. They are guarded by a multitude of

wooded islands which protect numerous inlets and unsurveyed passages. The land is of moderate height and free from snow in summer. The water is deep, with rocky patches which afford excellent fishing. Becalmed off some of these islets in 1880 we caught the large red rock cod (*Sebastes*), a fish resembling the red snapper in general appearance, as fast as we could pull them in. Halibut also abounds in suitable places along this coast.

The proximity of Cross Sound is indicated by the appearance of tiny bergs borne by the ebbing tide from Taylor and Glacier Bays. They are fascinating objects in the sunshine, from the opaline tints of the ice, verging, in heavy masses, to the most beautiful robin's-egg blue.

North and west from Cross Sound, in clear weather, such as we were favored with, a panorama which I believe to be unique extends for two hundred and fifty miles. It is difficult to describe the Fairweather and St. Elias Alps in language which will not seem overdrawn. No language can express the sensations which the view affords to a lover of mountains. As mountains only the Himalaya can be compared with them for sublimity and beauty, and here we have not only mountains, but the sea. The principal peaks, like Fairweather, have a prismatic form, generally a sharp angular summit, with a lower buttress or shoulder on either side. The upper two-thirds are wrapped in eternal snow, the lower portions are wooded except where the numerous glaciers wind slowly to the shore. The foreland is narrow and usually rolling, sometimes a nearly level plain of glacial débris. Few of the glaciers actually reach the water, most of them stop short behind the beach. The sea hereabouts, for several miles from the shore, is generally covered with a thin milky layer of glacial water, the oceanic blue surging up only in the vessel's wake. In the Fairweather group there are numerous glaciers which in their upper slopes often take the form of ice cascades, the blue of the broken surfaces of ice conspicuous below the immaculate névé snow. This group is separated from the eastern extension of the St. Elias Alps by the wide ice-field called by La Perouse the Grand Plateau. Coasting within a few miles of the shore, as we did in 1874 and 1880, this seems an illimitable plain of ice; and was so described by me in the Coast Pilot of 1883. At a distance of ten or fifteen miles off shore, however, a relatively low mountain range is seen behind it, which I saw for the first time in 1895. Separated from the front of the Grand Plateau by a projecting spur, lies Dry Bay, a series of shallow glacial lagoons, in the midst of which rises a small, high, black

rocky island with bluff sides and wooded top. Concealed by overlapping spurs of the range and sometimes blockaded by a temporary advance of the ice is the cañon of the Altsek River, a stream which rises to the south and east near the head of Lynn Canal and which has, on rare occasions, been descended to its mouth. It is absolutely concealed by the topography, viewed from the sea, and the sketch given in Tebienkoff's Russian Atlas must have been made from a verbal description, for it bears no resemblance to the reality.

Thence to Yakutat Bay, a glacial plain, intersected by lagoons and streams abounding in salmon, extends between the mountains and the sea, with a width of some ten or twelve miles.

At Yakutat, the old native settlement on the Port Mulgrave spit is now abandoned for another site on the mainland opposite. Here are several trading establishments, and a Swedish mission.

The new native houses are imposing from a little distance, being high frame structures with rows of false windows externally. Inside there is but a single story open to the ridge pole. The great increase in the value of sea-otter fur has supplied the means for these pretentious but shabby houses, which have neither the stability nor the dignity of the aboriginal log-houses. One native at the time of our visit had three sea-otter skins for which he had refused a cash offer of \$900. He expected to get \$400 apiece. One of these hunters was about to give a feast and had imported on the *Dora* boxes of Oregon apples and other fruit for the occasion.

In 1874 I gave one of these people an orange, the first specimen of a cultivated fruit ever seen in this part of the world, and which was taken away, with a sort of reverential awe, wrapped in a clean cloth to be exhibited as an extraordinary curiosity to his less fortunate neighbors.

The St. Elias Alps, westward from Yakutat to Icy Bay, have been well described by Russell in several interesting papers, and I have recently* given some account of the topographic and scenic features of the coast from St. Elias westward to Kaye Island. Before noting the new geographic features observed still further west, a few words on the cartography of the Gulf of Alaska and the Aleutian region are in order.

The earliest surveys which followed the rude sketches of the first Russian explorers, are due to naval officers in the service of Russia.

* Alaska Revisited, iv, The Nation, Vol. 61, No. 1573, pp. 131-2, 1895.

Krenitzin and Levasheff and later Sarycheff did useful work, and the latter prepared a series of charts which were engraved on copper and issued early in the century both as single sheets and collected in an atlas. Subsequently work of a more modern type and excellent quality was carried on and issued in a series of several sheets by the Russian Admiralty, 1847-8. While wanting in details of inlets and the shore-line of many of the off-shore islands, these charts* represent an excellent reconnaissance and are in some respects still more reliable than any of those which have succeeded them. The United States exploring expedition under Ringgold and Rodgers in 1855 prepared an excellent chart of the Aleutians, which, however, was not issued by the U. S. Hydrographic Office until 1868. The navigators of the Russian-American Company brought in numerous local corrections to the central administration at Sitka, and these data accumulated until Capt. M. D. Tebienkoff, of the Russian Navy, who was acting as governor of the Colonies, conceived the idea of combining them in a new series of charts. Most of the contributors were German and Finnish seamen who had risen to the command of the company's trading vessels, but rarely were qualified for astronomical work. Their charts, therefore, while most useful for the navigator in these foggy regions, where seamen have to feel their way about by dead reckoning, were deficient in the precision of their astronomic data and rude in the execution of details. A rather remarkable circumstance was taken advantage of to fill out gaps in unsurveyed localities. The Aleuts, like the other Innuut people, have a remarkable capacity for drawing, especially maps of the region with which their hunting expeditions make them familiar. These maps lay down with the greatest detail every bend of the shore-line and every rock or reef where sea otters resort or a kayak might suffer injury. One may be certain that every item so placed upon the map has an actual existence, though its relative position may be distorted. By a very natural sequence, we find that the parts of the map adjacent to a village or camp are unconsciously drawn by the native artist on a larger scale than those portions of the same island which are less familiar and more distant. Topography is not attempted or is but rudely indicated, but everything which bears on the canoe life of these amphibious people is carefully set down.

I have several of these unpublished sketches, one of which is reproduced to illustrate their character. This particular sketch

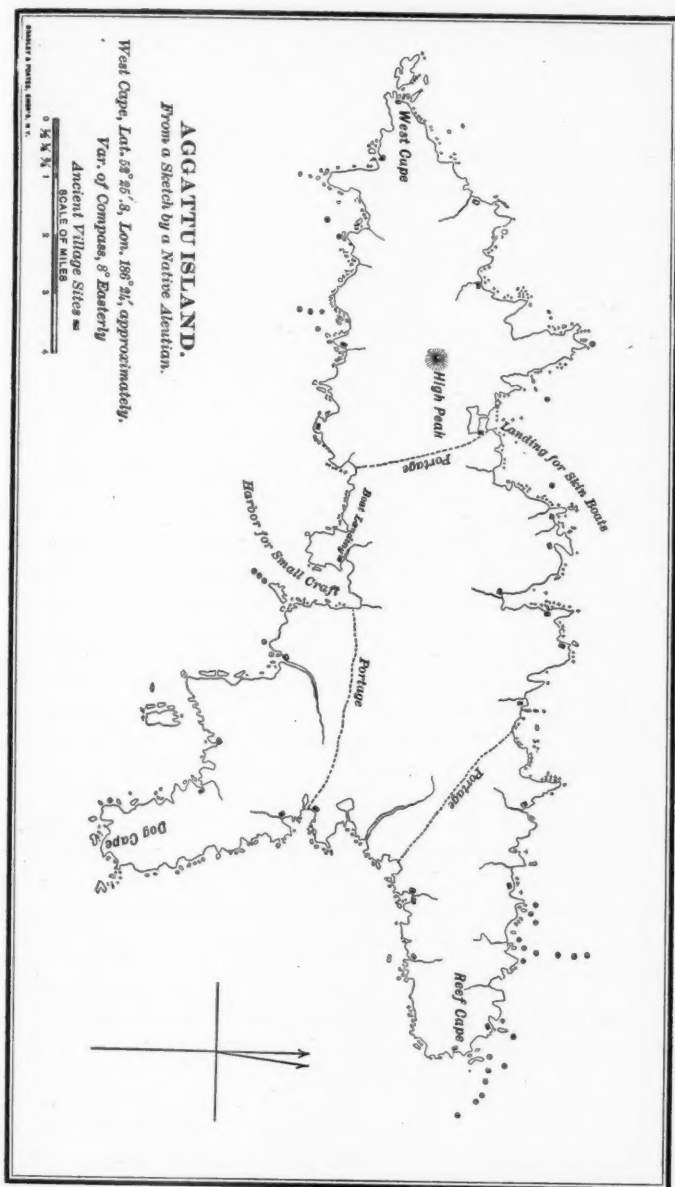
* Pacific Ocean Series, Nos. 7, 8 and 9.

represents the island of Aggattú, uninhabited, except by temporary hunting parties, for more than half a century, and still unsurveyed. When discovered by the Russians it was densely populated, and on the sketch a little rectangle takes the place of the cross by which the native draughtsmen marked the site of each ancient village. The original sketch was in pencil on a large sheet of brown manila paper. From this a tracing was taken on linen and this reduced by photography. On the linen were added (by me) the compass, approximate scale of miles, and lettering needed for explanation. Though the island has never been surveyed, its limits and the position of its west cape were fixed by the U. S. North Pacific Exploring Expedition under Rodgers. The scale is derived from a subdivision of the length given by Rodgers' chart, that being taken to be the same on both charts. The orientation is obtained in an analogous manner, and the astronomical position given is taken from Rodgers.

If the latter's chart is correct, the island is really more triangular and consequently of greater area. The natives practically confine their residence to the coast where they watch for sea otter. Consequently the relatively unfamiliar interior is dwarfed on their map. The coast with all its rocks, either awash or above water, kelp patches and islets, is represented in the most minute detail. As there is no permanent settlement and the natives hunt all round the island, the relative size of the different ends is probably less discrepant than usual on such maps. The original drawing by a native Aleut, who cannot read or write or speak English, was kindly lent me some years ago by Mr. Lucien Turner, who obtained it directly from the maker. I have similar sketches of the Semitchee and Attu Islands. Tebienkoff utilized quite a number of these Aleut sketches in his Atlas, adjusting them as far as possible by compass bearings and crude astronomical observations made by his navigators. His charts were engraved on copper at Sitka by a native Aleut, and the Atlas with a series of notes in the Russian language was issued at Sitka and St. Petersburg in 1852.

From 1868 to 1880 the U. S. Coast Survey were engaged in reconnaissance work in this region, with some sixty local charts of harbors and passages as a result. The general charts were compilations from previous surveys with local corrections.

The Tebienkoff charts were printed on very poor paper and rapidly wore out. After the American purchase of Alaska the navigators of the trading companies soon began to need charts, and a surveyor named Applegate prepared a number of manuscript



charts for this purpose. The Applegate charts were based on those of Tebienkoff, and were put together with mediocre ability, but contained additional data furnished by the company's masters from time to time; usually dependent on a few compass bearings and rough observations for position. They really formed a patchwork upon patchwork, and ignored the Coast Survey work almost entirely. In many cases sketches which had been adjusted in the Coast Survey work by triangulation, were adopted by Applegate in all their original crudity; and no reliance whatever could be put on the astronomical positions employed.

When the U. S. Str. *Albatross* began her fishery explorations on the Alaskan coast and in Bering Sea, in 1888, the officers on board under Capt. Tanner's direction made various reconnaissance surveys intended to improve the charts. Most unfortunately, in bringing the new work together, under the mistaken impression that the Applegate charts were an advance on those which had preceded them in point of accuracy, the *Albatross* work was combined with the Applegate maps as a basis and published in the Report of the U. S. Fish Commission without any such detailed explanation as would have shown what part was due to Applegate and what to the *Albatross* officers. Very naturally the U. S. Coast Survey hydrographers, taking the whole as vouched for by naval officers, incorporated the discrepancies of this compilation into their general series of charts for this part of Alaska, and have been followed to some extent by other cartographers. The result is a distinct deterioration in accuracy and a confusion which it is probable will not be corrected until an entirely new series of surveys has been carried out over the region in question. The corrections, which in the course of this paper I may be obliged to make, will be understood better by the light of the preceding bit of cartographic history.

After leaving Kadiak on a little tug of about 11 tons net burden, the first point of interest at which we touched was the uncharted harbor on the north side of Cape Douglas, the southwest point of entrance to Cook's Inlet.

This anchorage is included between the rounded, rather low peninsula of Cape Douglas, composed of mostly horizontal andesitic lava beds more or less interstratified with ashes containing plant remains,—on the east, and a narrower cape on the west and north, which is composed of a very level layer of subcolumnar andesite rising about forty feet from the top of the steep beach. On the upper surface are scattered occasional erratics. To the south three glaciers are visible, two coming down south of Cape Douglas and one ending in

a stream which discharges into the southern part of the bight. The southernmost glacier is the largest. The shore about Cape Douglas is defended by numerous rocks and should not be approached too closely. Within the bay anchorage may be had in two to five fathoms under the west cape, where the bottom appears to be clear. The south and east parts of the bay are more or less shoal and rocky, and should be avoided. In entering, the navigator should keep the western shore aboard. Shelter may be had here in any wind except heavy northerly and northeasterly gales.

Leaving the cape, the northern slope of the mass of mountains behind it is seen to be snow-covered and with three very large snowy glaciers descending to the vicinity of the sea. The easternmost appears to be the largest, and showed an even snowy surface without lateral moraines. Northwest of the group of mountains is a space of comparatively low land crossing the peninsula behind the shoal and dangerous Kamishak Bay. Over these plains many caribou are said to range in summer.

Between Cape Douglas and Augustin Island, and about six or eight miles from the latter, are the Sea Otter Rocks, a low group not definitely placed on the charts. We steamed a straight course of NW. $\frac{1}{2}$ W.* from the Cape in calm, clear weather, which, according to the latest charts, would have carried us directly over the rocks, but in fact carried us about two miles west from them. At low water there were two low, flat table rocks, with a smaller pointed one between them, visible at a distance of two miles, the eye being ten feet above the water. At high water they are said to be awash. We brought them in one with a high bluff, which we supposed to be Pt. Bede, on the east shore of the inlet, bearing NE. by E. These rocks constitute a serious danger to navigation.

Augustin Island (otherwise Black Fox or Chernobura) is a typical volcanic peak, with low borders of talus. At present anchorage may be had in three and a half fathoms, sand, about a mile off shore, with the south point bearing SE. by S., the western point NW., and the peak NE. by E. $\frac{1}{2}$ E. The south point is low and sandy, but the boat landing is best here, the beach running off very shoal north of it. The west point is composed of ashes and volcanic stones, forming low bluff banks and running off in flats upon which the boulders of volcanic rock, sometimes very large, are irregularly distributed. No chart of the island exists. There was formerly an excellent harbor for small craft on the west side,

* By compass.

and the inner harbor still exists, but the entrance is now dry at low water. This change was brought about at the time of the last eruption, less than ten years ago. That it was due to an elevation of the bottom and not to choking by the fall of erupted material, is evident from the presence of a number of more or less stunted spruce trees near the shore, which are evidently older than the eruption and would have been killed or buried by the fall of material sufficient to choke the harbor. The peak has the regular volcanic form, the rim of the crater being somewhat broken away on the west and north. Steam issues in intermittent puffs from the crater and inner cone, and when these puffs rise vertically and spread out like a mushroom above the peak, it is taken by the natives as an evidence of several days of calm weather, during which they do not hesitate to put out far from shore in their frail kayaks to hunt the sea otter. Dr. Geo. F. Becker and Mr. C. W. Purington of our party ascended the peak, which is some 3,000 feet in height. This was probably the first ascent which has been made, as there is no record of any previous visit by civilized explorers. The eruption referred to was accompanied by tidal waves and vast clouds of ashes, which were wafted to a great distance. On the west side of the inlet hundreds of square miles of spruce forest was killed by the load of wet ashes which descended on this occasion.

The upper two-thirds of the peak are largely snow-covered; below much is bare ashes and scattered lava blocks; then more or less herbage, with stunted spruce, sparsely scattered, and low, creeping alders. The borders of the island to the south and west are low, hummocky, and with many bogs and small pools. The south shore has bluffs of variable height, none very high. The passage west of the island is foul near the island shore, but has a navigable passage rather closer to the mainland shore.

Our next anchorage was at Tūxed'ni* Harbor, between the peninsular shore and Chasik Island (properly Khasik, but locally indicated as Chisik on some charts), of which no chart exists. That a snug harbor is to be found here is noted on a sketch chart of the U. S. Hydrographic Office,† but that the bay is five or six miles long, free from dangers, and forming a spacious anchorage, would hardly be supposed from the very imperfect indications given on the best charts. Chasik Island is narrow, and rises over 2,000 feet in height, with bluff shores, the water bold-to. There is a small,

* The correct form of the name was carefully recorded from native testimony.

† Notice to Mariners No. 4, Jan. 26, 1895, p. 50.

round, high rocky islet outside of Chasik which forms a convenient landmark for vessels feeling their way along shore in fog, which sometimes conceals the entrance. The southern end of Chasik is high and narrow, with no reef or rocks off it, as has been erroneously stated. The strata are somewhat inclined to the south near the entrance, but in the main are nearly horizontal and composed of heavy beds of sandstone and conglomerate of varying hardness, so that the upper part of the island weathers into steps like terraces on a grand scale, offering a remarkable castellated appearance to the spectator. The scenery here is very fine and peculiar in its features. The splendid volcanic peak of Iliamna rises among the mountains SW. by W. from the harbor at a distance of some fifteen miles. Its upper part is set with glaciers, but the conical form and scenic beauty of the peak can only be fully realized from a greater distance. The fairway of the harbor is nearly straight, with high and singularly weathered cliffs rising on either hand. Toward the head it widens a little. Here good holding ground may be had in 18 fathoms. At this point the vessel which carries down the product of the salmon canneries from the inlet is anchored for the summer. The canned salmon is brought to her by small, light-draught steam tenders, which can cross the shallow water on the bars of the rivers at Kassiloff and Nenilchik, where the salmon are taken.

From Capt. Hughes we learned that the spring tide in June was 36 feet; at ordinary times the range is about 24 feet. The northern end of the harbor is protected by reefs and foul ground beyond Chasik Island, where there is a large, open bay. There may be a channel out this way, but until it is surveyed it would be imprudent to attempt the passage except with small craft. Into this bay a large river falls, fed by the glaciers of Iliamna and the drainage of the other mountains. The north end of Chasik shows high bluffs, rising much above those on the main shore, and above is a magnificent castellated summit of curiously eroded, almost horizontal, beds of sandstone, limestone and conglomerate, which can hardly be less than 2,000 feet in elevation. Near the beaches the rocks are worn into caves, arches and pillars, about which circle innumerable multitudes of sea birds.

There is no bar or obstruction at the entrance of the harbor, but the great range of the tides and the narrow form of the harbor produce well-marked rips at certain stages of the tide, which might lead to the supposition that rocks or shoals exist. On the island side the shores are bold-to, on the main, at the head of the harbor,

shoal for a long distance from the beach. Notwithstanding the absence of protection at the entrance, southerly winds do not blow home into the harbor on account of the high land on either side; but, for the same reason, wind from the land is often stronger in the harbor than out in the inlet. July 23d, 1895, flood tide made shortly after 3 P.M.

All the navigation in the upper part of Cook's Inlet is commonly carried on with reference to the tides. A sailing vessel can make no headway against them, and it is the custom to anchor during the unfavorable tides, which can be done almost anywhere along shore. In pursuance of this practice, we anchored off the West Foreland, where there is a small village of Koo-tena Indians. Here the shore is of bluffs, apparently about fifty feet high, of gravel and sand, wooded above, with some high mountains distant in the interior.

We had slack water about 10 A.M., July 24, and started for North Foreland with the flood tide. Between the two Forelands is a wide bay, with shoal water and many scattered boulders rising out of it along the shore. The land behind is very low in part, all heavily wooded with spruce, and a river carrying very muddy water comes in here. Near the North Foreland is a series of whitish gravel bluffs of very regular height, with a broad beach and shallow water for a mile off it; with scattered—sometimes very large—squarish rocks of whitish color irregularly distributed over the flats. There are Indian houses in the principal gap in this series of bluffs, but the largest settlement, Tyónek, is near the point of the Foreland, where a small gravel flat exists. Here the water off the beach for half a mile is shoal, but not foul. Off the Foreland southward, in the middle of the inlet, most charts show an area enclosed by a dotted line connected continuously with foul ground on the southeast shore of the inlet. This is an error, as there is a clear passage on each side of the central patch, which latter trends with the inlet and shows at low water large, bare sand-banks, eight or ten feet high. East of North Foreland and between it and Point Possession, also in the middle of the inlet, is a flat or shoal not shown on the charts and which constitutes a serious danger. It is believed to be five or six miles long and not less than four miles wide, its southern edge about WSW.* from Point Possession.

The village of Tyónek is small, without a harbor, and the spot is inaccessible by sea in winter, as this part of the inlet freezes over. The tide is from 25 to 35 feet in range here, with a depth of 3½ fathoms half a mile off the beach.

* All bearings in this paper are magnetic.

Turnagain Arm extends to the eastward from Point Possession and is the passageway to the placer mines, of which much has been said in the public press. Dr. Becker's report upon these will be published by the U. S. Geological Survey.

The following notes may have some importance in view of the influx of population and the necessities of navigation: North-easterly from Pt. Possession on the continent the land is mostly low, formed by the delta of the Sushitna River, but at some distance inland rises a low but conspicuous peak known as Sushitna Mountain, west of the river, and a noted landmark. Eastward from the Sushitna another, the Knik or Fire River, enters the inlet north of Pt. Campbell. West of Pt. Campbell is a small, high island called Fire Island, to which sufficient water for an ordinary schooner may be had at low tide, according to local navigators. Both at Point Campbell and Point Possession the land is low and wooded, but about twelve miles eastward of the latter the mountains come to the water's edge, with narrow steep-sided ravines and cañons, in which are the streams where gold is washed. The land rises to about 2,000 feet; some of the peaks are perhaps higher, and the slopes are rather sparsely wooded. The rise and fall of the tide in Turnagain Arm is remarkable, and the middle of the passage, as well as much of its margin, is occupied by extensive flats partially dry at low water, with a shallow channel at each side. To enter the Arm and avoid the shoals keep Pt. Possession well aboard and steer for the northern edge of the high land on the south side of the Arm; keeping a little to the southward of a straight course between the two, and the lead constantly going, as the shoals shift to some extent. Allow for a tide of fifty feet in range, and select an anchorage in accordance with the circumstances of the case. The northern channel is not navigable eastward of Fire Island, and the island is nearer to Pt. Campbell and rather more southerly in position than indicated by existing charts. The shoal in the centre of the Arm is elongated, trending with the inlet and not rounded as on the charts. These shoals are mostly hard sand, with a few scattered boulders.

We anchored under the lee of a small, high, conspicuous rocky bluff, the first east of Pt. Possession, where the miners assured us there was always water enough to float our little tug. It is hardly necessary to repeat that here one can only move with a fair tide. At our anchorage, with the standard compass we found Pt. Campbell bearing W. 40° N., the north edge of Pt. Possession W. 10° N., the SW. edge of Fire Island in one with Pt. Campbell, Mt.

Sushitna NW. $\frac{1}{2}$ W., and the bluff point a cable's length to the east.

We left North Foreland with the flood tide immediately after it turned at 2 A.M., July 25th, and at 8 A.M. found high water at the bluff above mentioned, with 41 feet of water under us. There was a slack of about fifteen minutes. At 9.15 we put out the patent log to test the strength of the ebb, and found it to average three and a quarter knots during the first half, though we were out of the strength of the tide. It was slack water at 3.30 P.M., and there was less than two feet of water under our bilge, showing a range for this day of 39 feet at this point. We were obliged to await the bore helpless on the sand, and it did not keep us waiting long, but came in with a rush in a wave three or four feet high, which whisked us a mile and a half up the inlet before we could get out another anchor; and here, with full steam ahead and both anchors down, we had all we could do to keep her from dragging. The log showed a seven-knot current, and the water after the bore had passed rose six feet in ten minutes. At extreme spring tides the ebb would leave this anchorage dry and for a mile or two seaward. The force of the current was such as to twist our main anchor, weighing 250 pounds and of good Swedish iron, in two different directions. It was a fit object for a museum when recovered. We were happy to leave Turnagain Arm with the turn of the tide. Off the high land west of our anchorage is a small, high island called Haystack by the miners. It rises out of the flats, which dry all around it at low water.

Two days later we entered Kachekmak Bay, on the eastern shore of the inlet. This locality is interesting on account of the presence of extensive deposits of brown coal, and because it is the finest harbor in the inlet, never obstructed by ice, and one of the finest on the whole Pacific coast. The native name of the bay is Kachekmak, in allusion to the high bluffs of the northern shore; the natives of Chugach Bay (Prince William Sound) in coming to the inlet made a portage from the Pacific to the head of this bay, and so reached the Russian trading post at Port Graham, so the traders called it the bay of the Chugachi, or Chugachik. The native name was misspelled on an obscure map without the central "k," and although the Coast Survey in the first and only special chart of the bay gave the correct spelling, the Board of Geographic names adopted the incorrect form, which thus becomes obligatory in all Government publications.

This harbor separates the comparatively level plateau of the

Kenai Peninsula west of its axial mountain range from a spur of that range which comes down to the sea at Pt. Bede, with several indentations affording anchorage.

These mountains are not very high, but from them descend several attractive glaciers not difficult to reach. One of these I had visited in 1880 and sketched its terminal moraine. On a second visit in 1895 I found it had receded about 250 feet from its old terminus. The rocks on this side of the bay are mostly crystalline or eruptive, forming a marked contrast to the bluffs of nearly horizontal sandstone and clays with conspicuous coal seams which border the opposite shore. The harbor is protected by a long, low spit of gravel, within which is good anchorage close to the shore, but the beach in front of the bluffs makes off shoal for two, or, toward the head of the bay, fully three miles. We observed the range of tide in the upper bay to be 22 feet; at springs the extreme range is said to be thirty in the upper part of the bay and somewhat less toward the entrance. Excepting a few buildings connected with the work of coal prospectors there is no settlement within the spit. In the lower bay outside of the harbor is a snug anchorage, Chesloknu of the natives, Seldovia or Herring Bay of the Russians. Here are two trading stations, and most of the inhabitants from Port Graham, where the harbor is less convenient, have migrated to Seldovia village. There is quite a collection of houses and a Greek chapel. No chart has been published of this anchorage except a small delineation from a Russian sketch which is included in the chart of Kachekmak Bay, compiled by the Coast Survey in 1880. The bluff at the SE. head of the entrance is composed of two small rocky islets united to each other and to the mainland by a low spit, so that the land is not continuously high as represented on the sketch alluded to. The entrance has rocky bottom clear across, with kelp growing in five and a half fathoms. The northern head is bluff and rocky, a rounded boulder lies off it, visible at low water. There are also rocks above and below water about the opposite headland. Inside there are seven and eight fathoms, sandy bottom, off the village in mid-harbor, with protection from all winds except NW., and at the head of the harbor complete shelter.

On the first of August we visited Amalik Harbor, behind Takli Island, on the south side of Aliaska Peninsula. We found excellent shelter from all winds and anchorage in ten fathoms sand. A long inlet penetrates the land here which has never been surveyed. The rocks are mostly coarse sandstones pierced by volcanic dykes, and contain seams of a superior quality of brown coal.

The next point visited was Cold Bay of modern charts (Stu-
denaia or Frosty Bay of the Russians, Puale or Pūālū Bay of the
natives), a fine sheet of water of which no charts exist and the in-
dications on the general charts are very inaccurate. The entrance
is partially obstructed by an area of foul ground, with rocky islets
and pinnacles extending to the SW. from the northeastern point of
entrance for several miles. Another patch, separated by a clear
passage, is nearly in the middle of the entrance. The Russian
Hydrographic Chart of 1848 shows these with more accuracy than
any of the later maps, but barely indicates the inner shores of the
bay. Cape Yaklok (Jäklok of some charts) forms the SW. head-
land and is free from off-shore dangers.

There is just within this cape a small spit of heavy shingle, with
high rocky bluffs behind it. Here anchorage may be had in good
weather, and the camps of sea-otter hunters are often made.

There is no settlement in the bay, which is divided into two
arms by a high promontory near its head. The western arm ter-
minates in low flat land, behind which is a large lagoon, dry at
low water, into which empties a rather large stream. The land at
the head of the eastern arm is higher. Most of the topography
about the bay is high and barren, the rocks lying in nearly hori-
zontal heavy beds of sandstone and conglomerate, which weather
into benches and offer scenery of much impressiveness.

It somewhat recalls that at Chasik Island, but the mountain
forms are more massive and simple, with long, even talus slopes,
due to the disintegration of the rather friable shales, which are in-
terbedded with the sandstones. Near the water the bluffs were
curiously eroded by the sea and weather, and sheltered myriads of
sea fowl. Singularly enough, though the rocks in hand appear
brown or gray, the effect of them in distant masses was a marked
brownish purple, giving the landscape a peculiarly chilly aspect,
which well deserved the name applied to the bay. On the north-
eastern shore a stream comes in from a conspicuous valley, off
which, on a gradually deepening flat, anchorage may be had in any
depth desired. The water in most other parts of the bay is incon-
veniently deep. The shores near this place are of low bluffs of very
massive light gray limestone, without fossils, which falls in enor-
mous blocks, worn by the sea afterwards into very remarkable
spheroidal forms. From the high land about the bay in windy
weather heavy gusts sweep down, but the holding ground is good
and the anchorage at this point sufficiently protected from the sea.
The absence of trees gives an individuality to the landscape which

is very striking when one comes from the densely forested slopes of eastern Alaska.

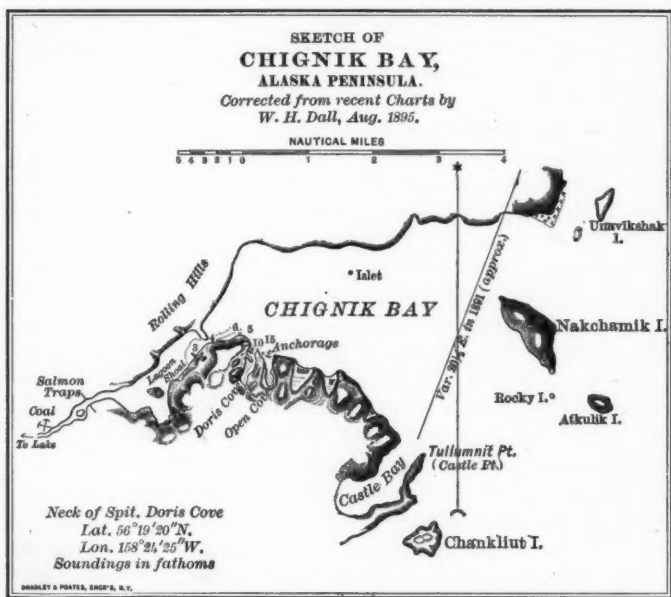
In Kialagvit Bay, further west, we have another large uncharted sheet of water, defended from the sea by a long line of islets. The indications of the general charts are very inaccurate. The bay at the eastward leading to the Becheroff village is clear of dangers, except near the points of entrance, where foul ground extends well off shore, and near the village where the water gradually shoals for two miles off the beach. There is no conspicuous mountain recognizable as the one on the charts near the village. The mountains resemble those of Cold Bay but, as the strata are inclined more steeply, do not show horizontal benches.

The entrance to the inner bay is rather close to the outer islets, with two or three fathoms over a bar. Within there are no invisible dangers and the water is mostly quite deep. There is a second entrance west of the first cluster of islets, with a clear passage and deep water according to a local pilot. There are several visible rocks there, but no hidden dangers. The portage to the Ugashik River of the northern slope of the peninsula, begins in a valley near the western end of the inner bay. At the extreme southwestern end rises the Olai volcano, from which on its eastern flank a large glacier descends; while on the seaward slope two others come down from the same *massif*. It is incomprehensible why all the charts should place Mt. Olai north of the bay and nearly midway of its length, since there is no volcano and no conspicuous peak in that situation. The mountains slope gradually toward the beach, covered with dense herbage, and near the portage is a notable locality for mesozoic fossils, where it would not be difficult to load a ship with ammonites.

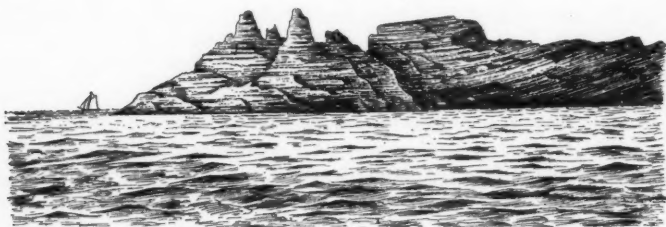
Chignik Bay, still further west, is a better known locality, which has suffered exceedingly from the attempt to combine the Applegate sketches with the previously existing data. In this process the bay has, on the resulting chart, been reduced to about one-half its proper area, while the characteristics of its southern shore have been grossly exaggerated in relation to those of the east and north. Nakchamik Island, which lies off the bay, has been brought within half the proper distance of the northern part of the Semidi group, and the great lagoon has been represented as wholly sanded up.

Chignik Bay is sufficiently represented in the sketch here given to require no detailed description, but a few notes will be of use to navigators in advance of a fuller survey.

The bay opens to the eastward with no concealed dangers. Its south point of entrance is Tūliūm'nit Point, a remarkable headland,



sometimes called Castle Point, which forms a landmark for navigators in this vicinity. The sketch of this headland herewith, bearing SSW. one mile distant, is made from a photograph taken on ship-board by Mr. Ezekiel, of Woody Island, Kadiak, and kindly pre-



TŪLIŪM'NIT POINT, CHIGNIK BAY, SSW. 1 MILE.

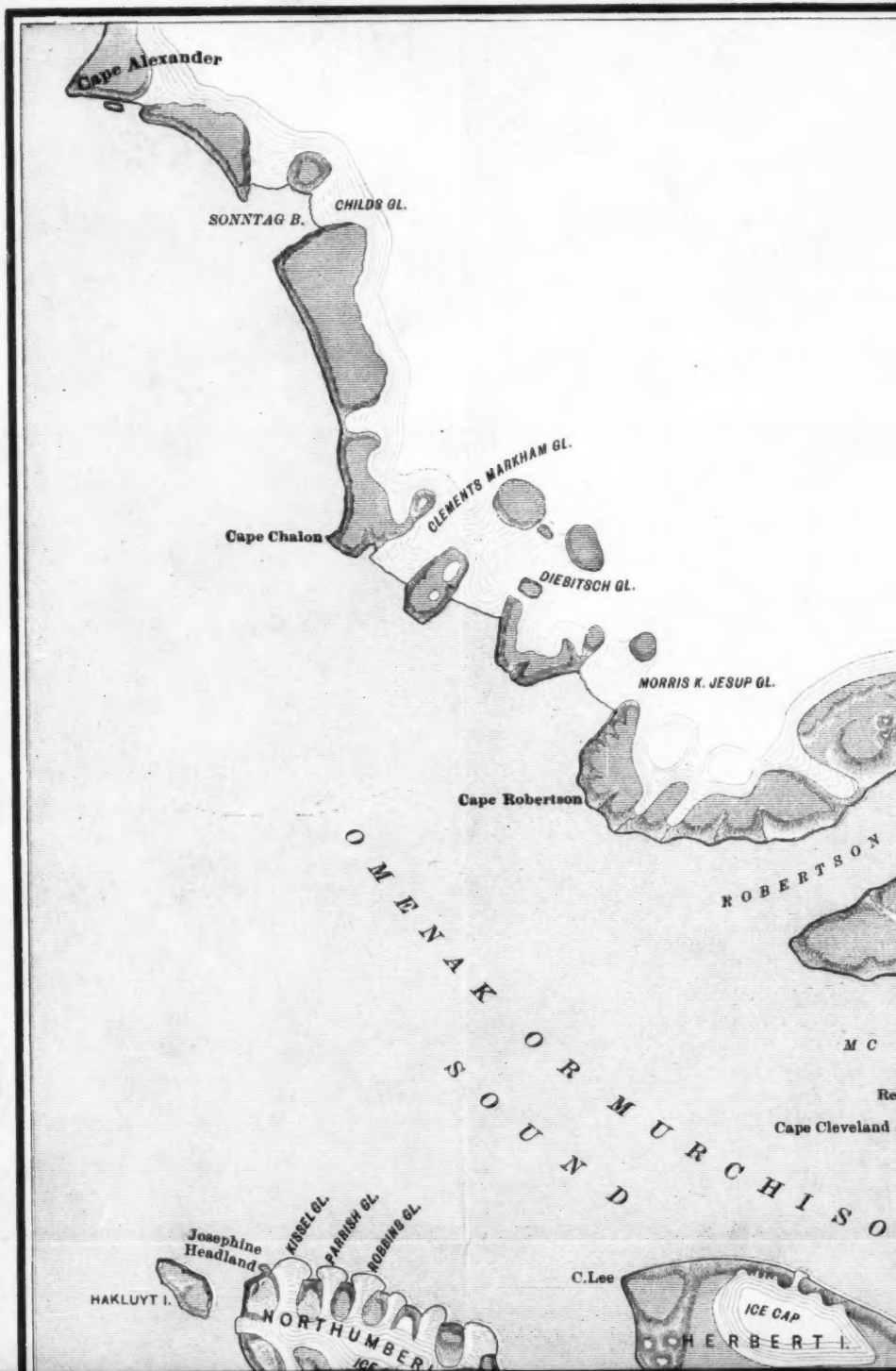
sented by him. The point is extremely narrow and composed of tertiary sandstones, forming a shallow syncline, the stratification

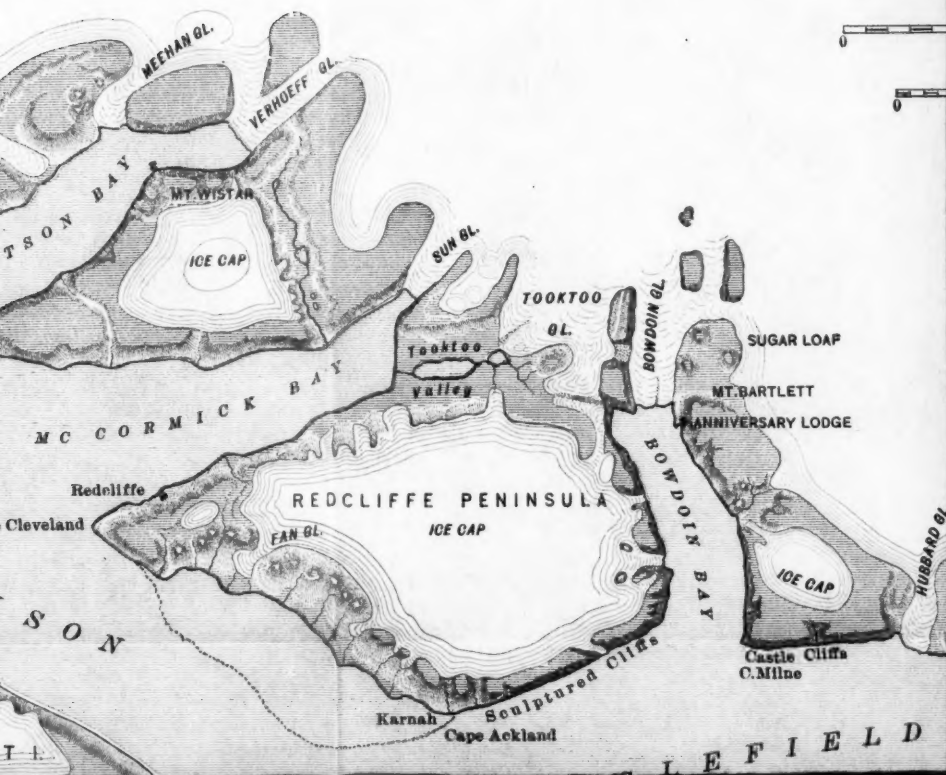
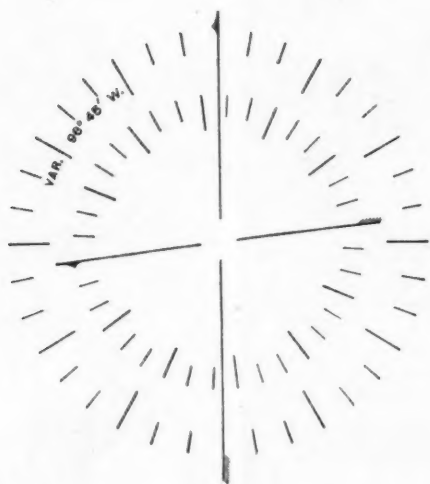
being a conspicuous feature. North and west of the point is a deep indentation known as Castle Bay, unsurveyed, but which is said to afford anchorage on its northwest side. The grassy highlands west of the bay afford feeding grounds at times for the wild caribou, and by driving them on to the narrow point (which at one place is only a few hundred feet wide), large numbers are said to be secured by hunters. The south shore of Chignik Bay west of Castle Bay is bluff and high, with four indentations, the two to the east being closed by bars of gravel behind which shallow lagoons exist, while the two further west afford anchorage. The westernmost, named Doris Cove, is a snug and perfectly protected harbor and was surveyed by the U. S. Coast Survey in 1874. Here the vessel which serves the associated salmon canneries is anchored during the season. The extreme southwestern corner of the bay is marked by a round-topped vertical bluff, at the foot of which is the entrance to Chignik lagoon, protected by a long sandspit with a navigable channel between it and the bluff. Although this passage is represented on the later charts as entirely sanded up, there is a least depth of two fathoms on the bar and 22 feet of water at high tide. The channel is moderately wide, and inside the entrance offers three to five fathoms over sandy bottom as far as the canneries, beyond which the lagoon is shoal. At high water a three or four foot channel leads to the head of the lagoon where a river enters, at the mouth of which are the salmon weirs. A light-draught stern-wheel steamer affords transportation, and there is water enough in the river to permit the ascent of this boat several miles to a point where a seam of brown coal is worked by the association for use in the canneries. The catch of salmon from this single stream annually amounts to about five million pounds of fish. It was high water in the lagoon about 1.30 P.M. on August 4th. The river is bordered by vertical banks of tertiary rocks thirty or forty feet in average height. Two or three miles above the coal mine the river issues from a large lake, said to be six or seven miles long and connected with another, equally large, by a stream five or six miles in length. The topography is rolling, with low hills and a wide expanse of tundra on which caribou find grazing.

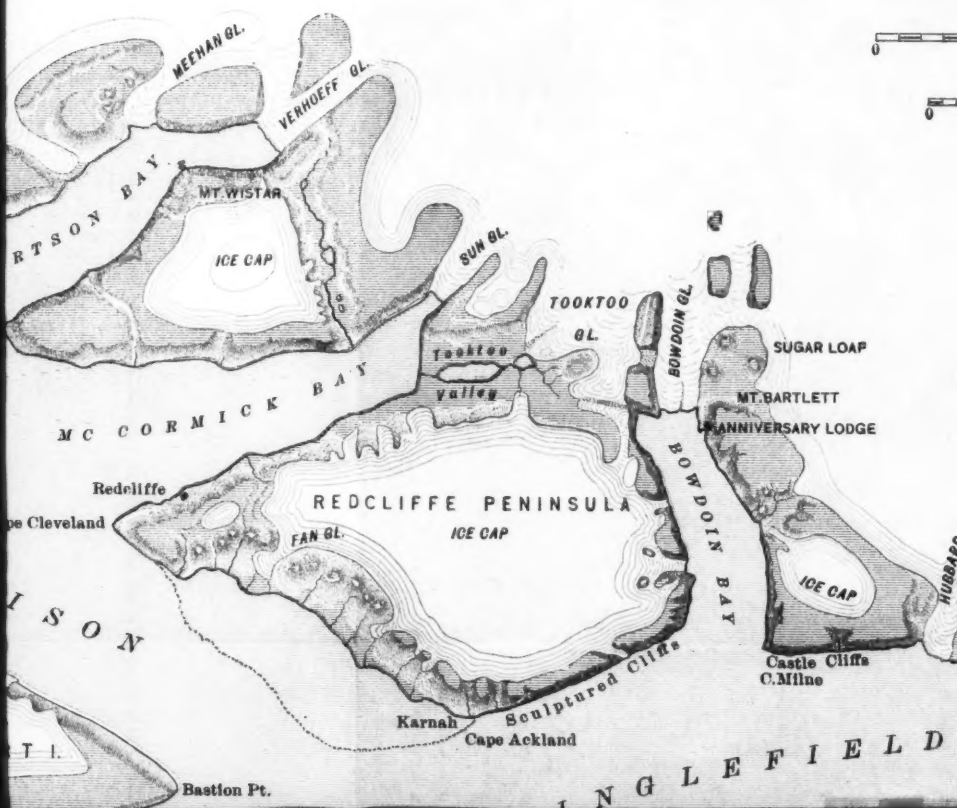
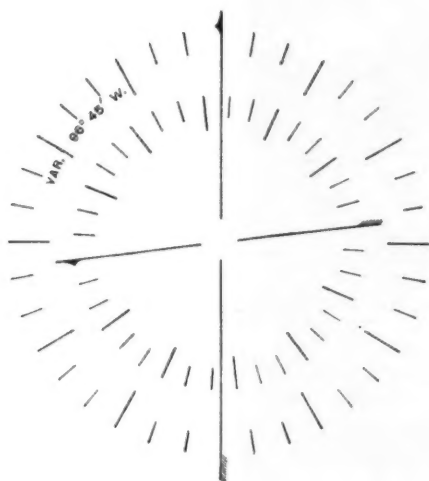
An important centre of trade, fisheries for cod, and gold mining, is found in the Shumagin Islands, at Delaroff Harbor, Unga, and Sand Point, a few miles above. The harbor of Delaroff village has not been surveyed, though a small Russian sketch was printed many years ago. It consists of an outer roadstead surrounded with

rocky cliffs, where vessels may lay to a mooring; and an inner lagoon which has been stated to be silted up. We found, however, that good anchorage for vessels drawing not more than twelve feet may be had inside the entrance to the lagoon. This is important, as the outer bay is unsafe in southeast gales and several wrecks have occurred there. The anchorage is in mid-channel in three and a half to five fathoms, with a lee afforded by a reef and kelp patch on the south side of the entrance. A dangerous rock exists off the outer roadstead which I found to lie SE. by E. $\frac{3}{4}$ E. from the middle of the entrance to the lagoon. Going out we found the breaker in line with the trend of the point at the south head of the outer bay. From the inner anchorage the visible south end of Nagai bore E. by S. $\frac{1}{2}$ S., the inner north headland E. by S. and the rock at the south headland S.E. by S. $\frac{1}{4}$ S. by compass.

A visit to the volcano islands Bogosloff and Grewingk, west of Unalashka, afforded many notes of interest, but my companion, Dr. Geo. F. Becker, in charge of our party, contemplates a special report upon these islets, so I will close these hydrographic notes by stating in the interest of navigation, that the long spit of ash and volcanic gravel which formerly connected the two volcanoes is now broken by a navigable passage (the existence of which has been recently mistakenly denied), directly over the spot where for more than a century Ship Rock of Cook towered in solitary majesty. The newer Grewingk volcano gives out but little steam, and the peak which at first surmounted it has fallen in or crumbled away until the upper part of the island is approximately level, or appears so from the sea. From the southeastern side of the island a long, low falciform spit extends, off which in fair weather protection may be had from westerly winds, and parties desiring to visit the volcano may, with care, effect a landing.





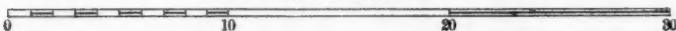


MAP OF
WHALE SOUND
GREENLAND

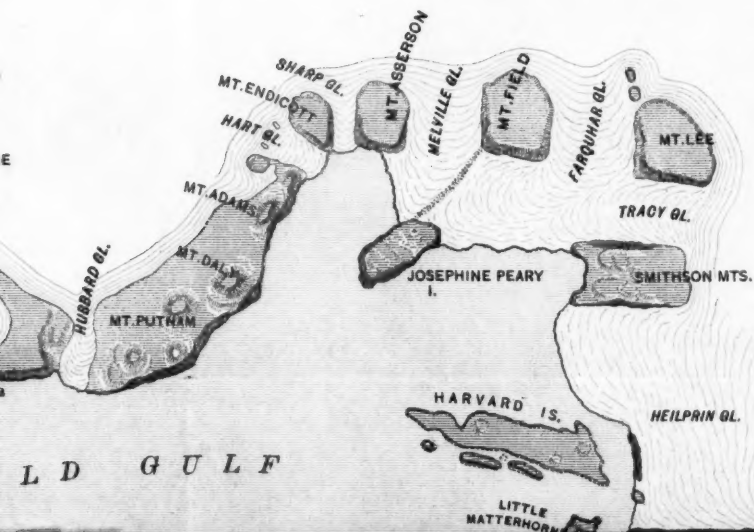
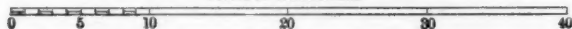
*From Surveys by Civil Engineer, R. E. Peary, U.S.N.
 Assisted by Hugh J. Lee
 1894-'95.*

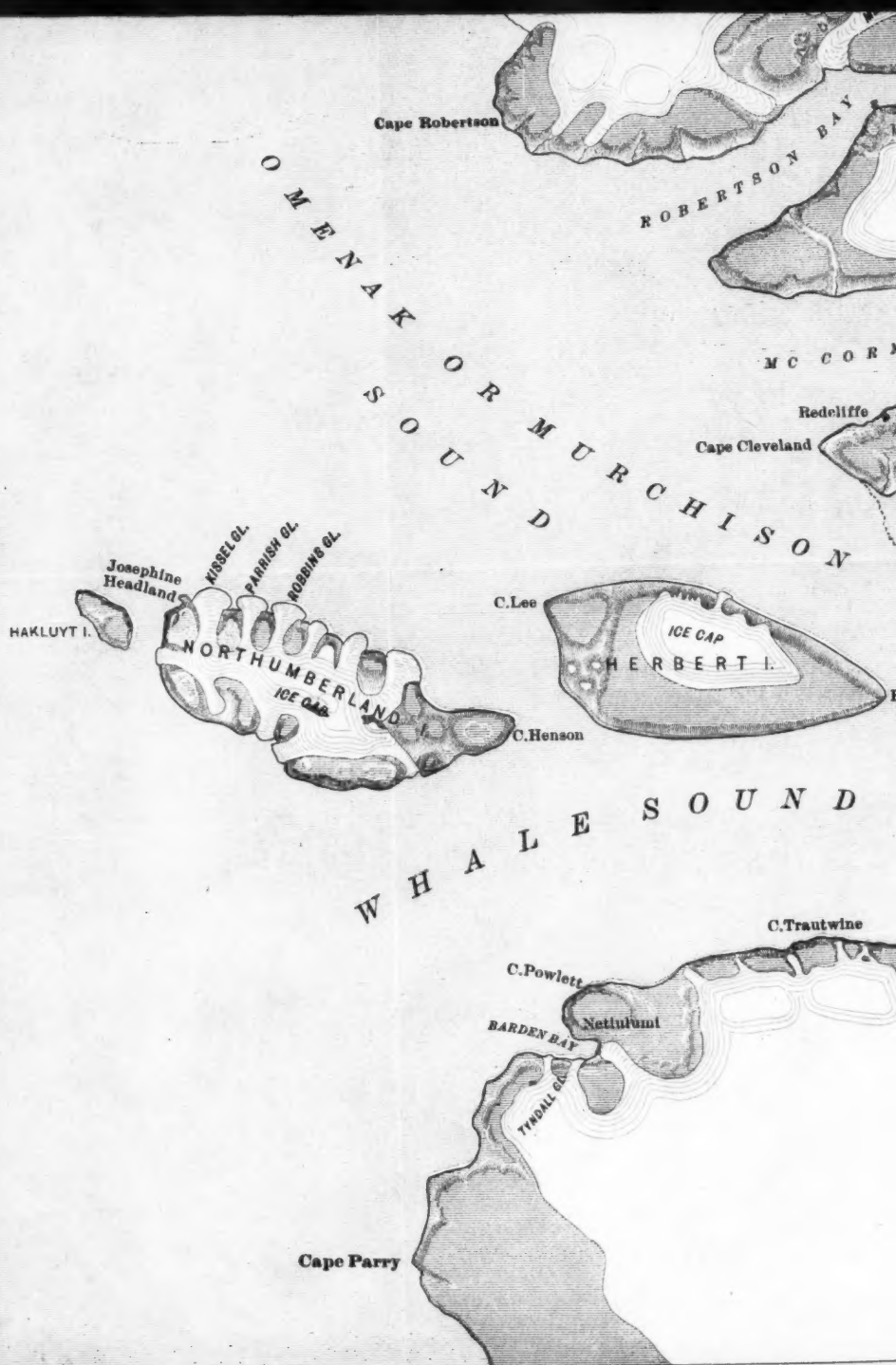
Lat. of Lodge $77^{\circ}41'35''$ N. Long. of Lodge $68^{\circ}40'$ W.

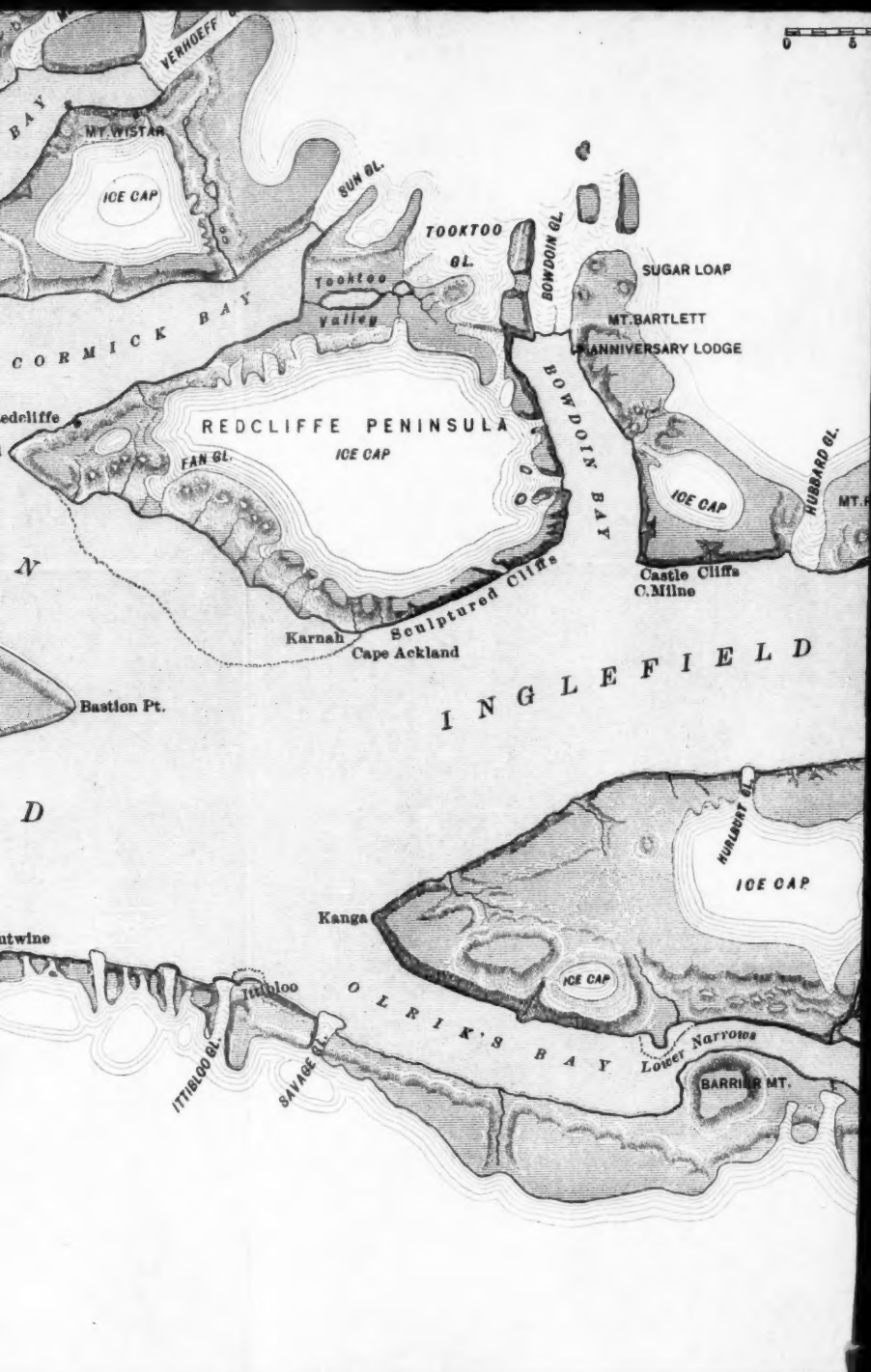
SCALE OF MILES

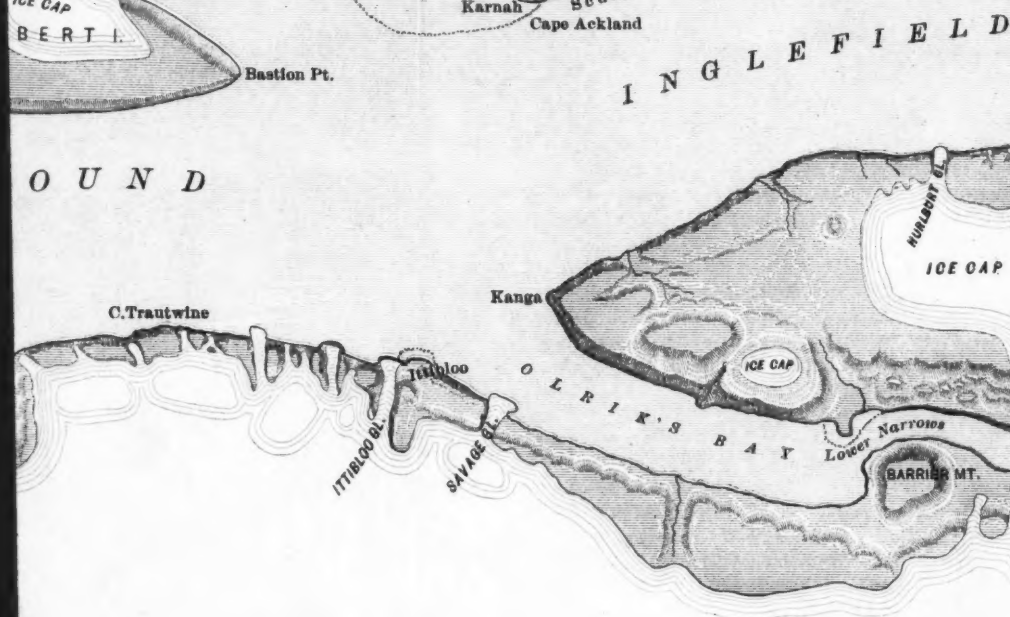
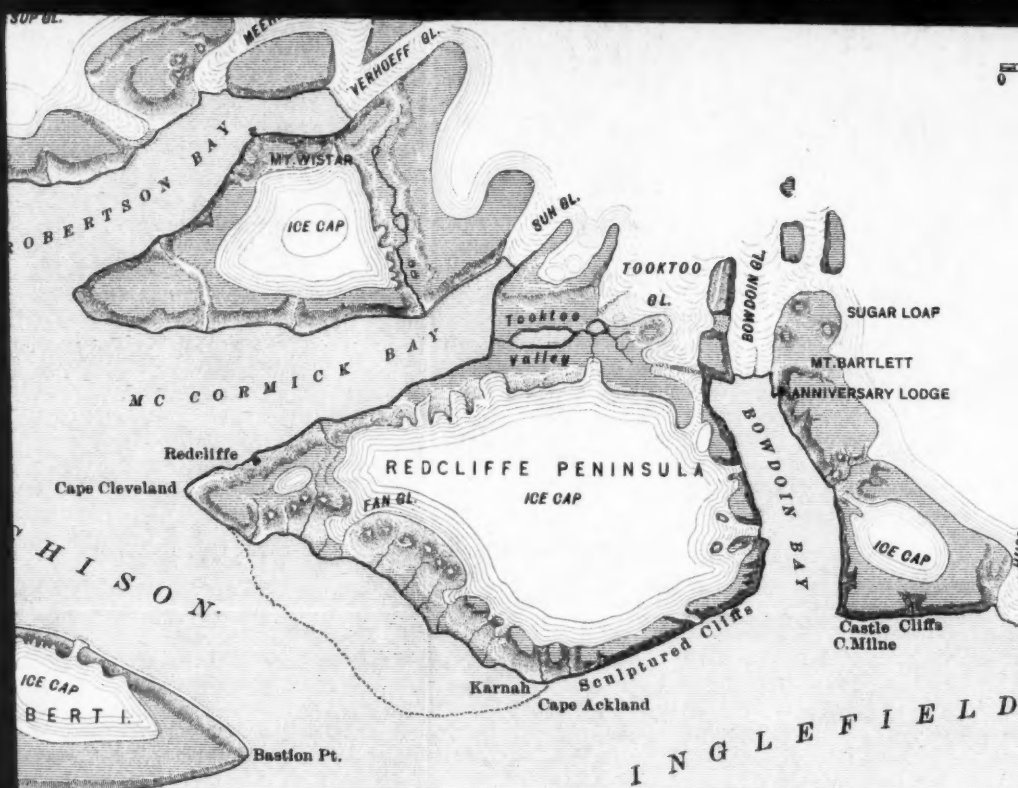


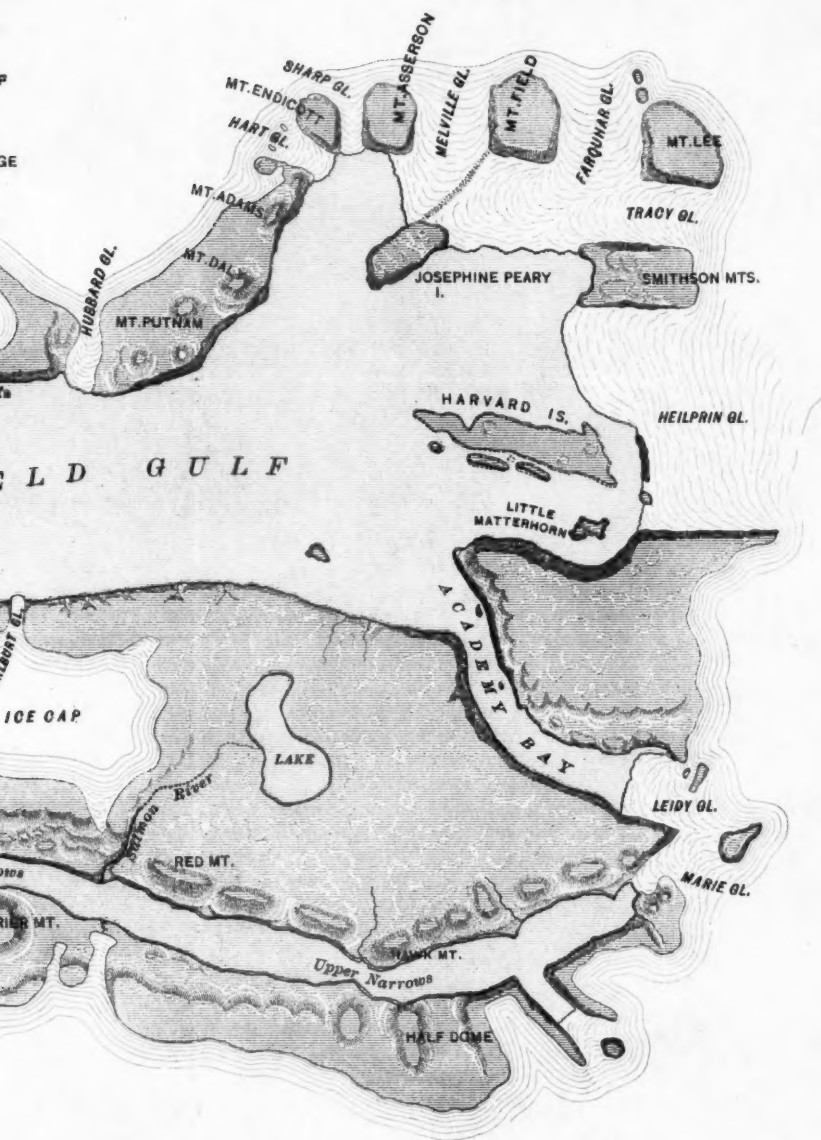
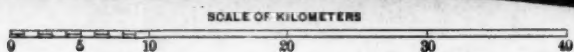
SCALE OF KILOMETERS











BRADLEY & POATES, ENGRS., N.Y.

WORK IN NORTH GREENLAND IN 1894 AND 1895.

CIVIL ENGINEER R. E. PEARY, U.S.N.

When on the 28th of August, 1894, I pulled away in my whale-boat from the side of the ill-fated whaler *Falcon* lying to in Smith Sound off the Petowik Glacier, my feelings were not of the cheeriest, yet I had no reason to think that my chances of carrying out my cherished plans were, barring unavoidable accidents, other than good. Though the *Falcon* was separating me from those near and dear to me she was carrying them to safety and comfort, and she was leaving me with a small but experienced, effective, homogeneous and loyal party.

In the boat with me were one of my companions, Henson, and five of my faithful, trusty Eskimo allies, dusky children of the north. Nearly two hundred miles north, at the Lodge, at the head of Bowdoin Bay, was my other companion, brave, loyal Lee, awaiting my return. At the Lodge with him was an ample supply of all the essentials of life, except meat, requisite to carry us through the winter and early spring. Cached on the "great ice," at various distances of from twenty-six to one hundred and twenty-eight miles from the Lodge, were all (except a few minor) supplies needed for the white march across the "great ice" the following spring and summer.

My general programme was, as soon as I could have regained the Lodge, to proceed with some of my native allies to the deer pastures of Kangerdlooksoah and draw upon them for our own meat supply for the coming winter; then to levy tribute on the walrus at their feeding grounds in Omenah Sound for my winter supply of dog food. After that I would visit those of the caches upon the "great ice" located within a distance of fifty miles from the Lodge, dig them out, re-arrange them again upon the surface of the snow, and re-erect any signals that might have been broken off or blown down by the wind.

I should then endeavor to pass the winter leisurely working upon our equipment for the long sledge journey; exercising the utmost care to keep ourselves in physical condition, and conserving every energy, physical and mental, for a fight to the finish, when once again we attacked the "great ice."

All the time I recognized two eventualities which might defeat

everything. The first was the breaking out of the Pibloktoo or epidemic dog madness among the native dogs, which, if the attack were serious, might almost exterminate the animals of the tribe and render it impossible for me to obtain dogs for the journey across the ice-cap. Second, the arrival of that end, which in the words of brave Horatius, of that other dauntless three, comes to each man soon or late.

I place the latter possibility second intentionally because without dogs it would be folly to think of attempting the conquest of the "great ice," while the reduction of our number to two would not necessarily mean the same. The journey to Independence Bay had once before been made by two, and there seemed no reason why it should not be made by two again.

As I stood in the stern sheets of my boat looking at the *Falcon*, her propeller began again its monotonous song, she swung on her keel, gradually gathered headway, and, threading her way among the bergs and floes, disappeared in the ice of the southern horizon.

Turning in the opposite direction, northward, toward the gloom of the coming Arctic night, for which my boat was heading, my eyes rested upon my Eskimo crew, pulling with all the strength of their iron-muscled backs, for the shelter of the bleak rocks of Cape Athol. A strange, wild, fur-clad crew, with dirty, greasy faces and coarse, matted hair, yet sturdy and faithful.

The brief Arctic summer was at an end and the lifeless gray sky hanging low over the icy waves of the North Water, and the black snow-capped cliffs of the iron-bound shore, made my crew as anxious as myself to reach the Lodge at the earliest possible moment, and lessen the chance of being caught in one of the violent storms which frequently mark this season of the Arctic year.

It was a curious coincidence that forty years (less half an hour) before, the "boat party" had left the *Advance* in Rensselaer Harbor in an attempt to reach Upernavik. That party was bound south, I was bound north, and the coincidence was more strongly accentuated by the fact that my first landing, twenty hours after separating from the *Falcon*, was at the place where that party had been stopped by the ice, and where they were obliged to build a small stone shelter in which they lived some three months until forced by starvation to retreat to the ship. In these twenty hours we passed the only critical part of our voyage, the wide and usually wind-swept mouth of Wolstenholm Sound, which, with its floating ice and tidal currents, would under unfavorable circumstances have been a very disagreeable stretch of navigation. Fortunately it was

very calm at the time we crossed, and we reached and pulled along the "Land of Noogli," with the heavy north-water swell breaking in foaming thunder upon its low iron shore. From here I continued my voyage northward, and rounding the frowning black cliff of Cape Parry (Kangahsub, the "Great Cape" of the natives,) entered Whale Sound, then coasted along the southern shore of this Sound into the river-like reaches of Olriks Bay to the deer pastures near its head to obtain some venison. The shelter of this bay was reached just in time to escape a violent southeaster which came rushing down from the frozen heart of the "great ice," swept over the crests of the cliffs in a blinding cataract of drifting snow, that mingled with the sheets of white spray torn from the water, till the entire Bay from water to mountain summit was a roaring, surging Arctic inferno. Nine days after leaving the *Falcon* I reached the Lodge.

The new ice was now rapidly forming in every place where the water was not constantly agitated by the wind, and it was only after the most arduous efforts that I got my boat within five miles of Falcon Harbor, where it was hauled out, and we walked overland to the Lodge.

There was no time to lose, and in twenty hours after our arrival Henson was on his way with the Eskimos to Kangerdlooksoah for deer.

Immediately upon his return Lee and myself started for the walrus grounds, where I harpooned and secured seven of these animals, and on the last day of September the final load of this meat and blubber and all our venison was safely housed. Space does not permit a description in detail of these walrus hunts. Any one in search of the excitement of bagging big game, will find it in the superlative degree in harpooning walrus. The setting of the scene is savage in the extreme: the barren snow-covered shores, tenfold more dismal and desolate in the sombre twilight of the Arctic autumn, the dead white, ghastly ice floes and spectral bergs driven here and there by winds and currents, and the black water swirling between. To creep among these bergs upon a herd of walrus stretched upon an ice pan, and as the huge half-frightened, half-enraged brutes plunge for the water, to spring to one's full height and with a motion that calls every muscle from toe to neck into play, hurl the flying harpoon at the nearest, then throw the coils of line over board as the harpoon quivers in the armor-like hide, will string the nerves to such a pitch of intensity, that when a moment later the sinuous, flexible harpoon line, the end of which is fast-

ened to an iron bolt in the bow of the boat, becomes a vibrant rod of steel singing like a great æolian, and the boat, with the foam hissing from her bows, goes tearing wildly through the ice in tow of the great maddened brute, every fibre of one's body will be in unison with the singing line.

The next event was the search for the caches of provisions which I had left up on the inland ice the previous spring. Had it not been imperative that I should first assure my winter's meat supply for both men and dogs, I should have searched for these caches immediately after my return from the ship; but there had been no alternative left me. Now, was the first opportunity. With Matt, one of the young Eskimo men who rejoiced in the name of Mak-sangwah, but who was more familiarly known as "Flaherty," and ten of my best dogs, I started to accomplish this work. It was very late in the season now; we had but a few hours of daylight, and work upon the ice-cap could be prosecuted only under serious disadvantages. The first day's march on the "great ice" was, however, satisfactory, and I camped at night with sanguine hopes of finding my caches on the following day. The next day we reached the site of my first cache, but before we could begin the search for it it began snowing with every indication of one of the severe south-easters which characterize the beginning of the long Arctic night in this latitude.

So discouraging were the atmospheric prophecies to my Eskimo companion, "Flaherty," that after the tent was pitched and while Matt and myself were inside arranging the sleeping bags and putting the cooking apparatus in commission for our supper, he seized the opportunity to beat a retreat for the Lodge. Though very much irritated at the moment, I was afterwards glad that he left us when he did. Poor fellow, I learned afterwards that it took him four days to reach the Lodge, arriving at the end of that time so weak with hunger and cold that he could barely crawl.

As for ourselves, after making every preparation for the protracted storm, which long experience on the "great ice" told me was now upon us, Matt and myself turned in.

Reluctantly I resigned myself to the inevitable prospect of another of these dreary storm-bound episodes upon the "great ice"; only hoping that I might be as fortunate as hitherto in sleeping away the majority of the long hours. All night and during the next day the monotonous music of the storm continued. Late in the afternoon the wind slackened a little, enabling us to get out of the tent, feed and untangle the dogs, and muzzle several suspicious

characters that might be expected under the influence of that arch devil of mischief and destruction which in storms on the "great ice" possesses the Eskimo dog, to chew up harnesses, traces and each other.

Then another and another and another similar night till six weary gnawing nights and days, the most accursed I ever spent upon the "great ice," had crawled their slow lengths into the past. At last came the cessation of the storm and hastily digging out tent and sledge from the drift, we harnessed up the dogs and began the search for the caches.

I feared from the first that this search would be unavailing, for during the six days' storm, over three feet of snow on the level had fallen. Yet through every minute of the precious daylight we diligently quartered the surface of the desert of snow, straining our eyes in the effort to detect a bit of the poles which had been left to mark the position of the caches, still projecting above the snow.

All our efforts were in vain. All of my essential supplies for the coming sledge trip, a total of nearly a ton and a half of provisions, had been swallowed up beyond recovery by the insatiable ice-cap. I was almost stunned by my loss; I felt like a man shipwrecked upon an uninhabited shore with nothing left him but the clothes upon his back. With the return from the ice-cap in this pleasant frame of mind began the long winter night. While on the ice-cap 6,000 feet above the level we had several hours of daylight; down at the Lodge at the sea-level under the shadow of the mountains, the duration of daylight at noon was but an hour or two. We were already on the confines of the valley of the shadow of death; the great, the indescribable night of the Arctic.

With the commencement of the Arctic night begins the monotonous hum-drum house life of the Arctic explorer. The hardest, and even under the most favorable circumstances, dreariest time of all for him. We entered its gloomy depths under doubly unpleasant conditions.

The loss of my caches had been a blow which dazed me for a time. We had been badly enough off before in regard to equipment, having only odds and ends and wreckage, so to speak, from which to evolve it; all the flower of my material having been expended on the first attempt and the fall work of 1893. I had, however, seen my way clear to obtain from the material at hand such an equipment as I believed would meet our requirements.

Now practically all of my provisions were gone. To understand

how almost hopeless this loss made our projected journey seem, I will go into detail.

All of my pemmican and alcohol, the two prime essentials of Arctic sledge work under any conditions, and doubly so for ice-cap work, were lost. All my compressed pea soup, which on the previous journeys had proved such a valuable adjunct of the pemmican, was gone. Nearly all my biscuit and milk ditto. Of one thing only had I an ample supply still left, compressed tea.

What should I, what could I do? and yet the idea of abandoning the journey even in the face of this apparently overwhelming disaster, never for a moment occurred to me, nor I think to either of my companions. It would be necessary to revert to first principles as to our rations, revise our programme, and then leave the result to the Almighty.

An account of stock at the Lodge showed the following as regards rations:

Raw, frozen venison for ourselves, and frozen walrus meat for our dogs must take the place of pemmican; and coal oil must serve as a substitute for alcohol.

We could make out full rations of tea, biscuit, oil, and meat, as above for ourselves and dogs for two months, *i.e.*, sufficient for the journey to and from Independence Bay under favorable circumstances; and have some tea, biscuit, and oil, still remaining for use beyond that point.

For dog food and our own meat rations beyond that point our entire dependence must be upon the country beyond the ice-cap.

I had on the previous expedition demonstrated that one pound of pemmican per dog and three-fourths pound per man per diem would keep both in good working condition. The values of walrus meat and venison for such work were unknown quantities, though unquestionably much inferior to pemmican, yet I felt that we stood at least an even chance of reaching Independence Bay, and that chance we would take. Beyond there everything would depend upon circumstances, and by a favorable combination of these we might yet accomplish something.

Heavily handicapped at best, my chances for accomplishing anything beyond Independence Bay depending entirely upon the most fortuitous combination of circumstances, my haunting fear was that something would happen to prevent our even starting from the Lodge. Had the problem before us been merely the passing of the winter in comfort and safety I should not have had a care. As it was, my favorite nightmare during the winter was to dream that I

was back home again without having been able to make another attack upon the ice-cap, and I would waken with a feeling of positive relief to find myself stretched on my bearskin with the howling wind of the great night tearing at the house, and to realize that I still had the struggle before me. That I had reason for this fear will be understood from our utter lack of any margin for accidents or mishaps, either to ourselves, our material or our supplies.

Should the dog madness descend upon the dogs it would end everything completely; should I happen to be disabled it would result in the same way. Should Lee or Henson meet with an accident or be taken ill and die (and we had no doctor) it would be a crushing blow. Should the house catch fire and our material or scant sledge supplies be destroyed it would cripple us.

And I had reason for these fears. Lee came home from an October surveying trip so used up that it took weeks to get him in shape again. Matt entered the New Year with an attack which here would have been called the grip, and I, going out to lash down a sledge in one of the furious winter blizzards, was nearly brained by a heavy box of frozen meat which, blown from the roof, just grazed my temple and struck a glancing blow upon my arm, rendering it useless for a week. I should have liked to put my comrades in fire and burglar proof safes and had them fed with a spoon, until the day arrived to start upon the ice. This was impossible, however, and instead we travelled as much as we could, utilizing each of the three winter moons for this purpose.

During the December moon Lee and myself went to Cape York, leaving the Lodge on the 10th and returning on the 24th. During this sledge trip, made in the depth of the Arctic night, we experienced no serious discomfort except during the last return march, when we travelled for 46 hours without food or sleep and were in no special danger except for a few moments while rounding Cape Parry, when a big berg capsized, breaking the ice about me, and I narrowly escaped being engulfed with my team.

One of the main objects of the trip was to determine accurately the positions of the prominent points of this coast, as Capes Parry, Athol, York, Conical Rock, etc., etc., but the frozen condensation from the North Water, which was steaming like a huge black cauldron, shrouded the coast in a silvery veil and rendered the stars invisible most of the time. After the sun returned in the middle of February, one of us was in the field all the time, Lee continuing his traverse survey of the shores of Whale Sound and its tributaries,

Matt hunting, and myself visiting the settlements and obtaining dogs and other articles necessary to complete our equipment.

At last the day arrived to which I had looked forward and for which I had planned so long, the day set for the departure upon the journey across the "great ice."

What a striking illustration of the law of the failure of reality to equal expectation! Though at last in the position for which I had so long worked, I was terribly handicapped. Equipment and rations were both make-shifts, devised to the best of my ability from the scant means at my command, and many times when at work upon them was I reminded of Robinson Crusoe devising his boat and its simple fittings from material ill-suited to the purpose. I was, however, better off in equipment than in provisions.

Experience and ingenuity could make up for deficiencies in the former, but nothing could take the place of the alcohol, pemmican, and pea soup. So heavy was this handicap that it more than made up for our perfect training and fitness, and our complete experience.

And here let me correct an impression which I have found current in some quarters in regard to the loss of my caches which caused this heavy handicap.

It has been assumed by some that my caches were lost because I failed to properly determine their position. The actual fact was that my caches were completely submerged in an almost inconceivable deposit of nine feet of snow on a level, which left absolutely no vestige of them above its surface. The one cache which was found had been dug out of the snow during the summer and the pole marking its position reset.

This cache was 42 miles from the Moraine, and the circumstances attending its recovery were interesting.

When I reached the point where, according to my reckoning, the cache was located, I stopped the sledges and sent my Eskimos out with their dogs to quarter the surface of the snow-plain in every direction in search of trace of it. In less than five minutes a sharp-eyed, keen-scented dog made a dash at an almost invisible spot on the snow, which proved to be about three inches of the top of the signal pole still projecting from the surface, but rendered invisible from every direction but one by a tiny drift. It was within one hundred yards of where I had stopped my sledges.

The details of the march to Independence Bay and return have already been told in these pages, and it is not necessary to repeat them here.

When we started on this journey we knew that we were relying

solely upon our own exertions and the Almighty. Whatever fortune, ill or good, awaited us in or beyond the heart of the "great ice;" whatever accident or mishap befell; there would, there could be no rescuing party. And even if we returned in safety, if the trust which I reposed in my Eskimo friends was ill-founded, we might find our house and stores appropriated, and ourselves left destitute.

Those who remember my journey in 1891 will recall that on the upward march, in my effort not to make any more easting than was absolutely necessary, I was repeatedly turned from my course by the unexpected penetration of the glacier basins of the great fjords of the northwest coast of Greenland into the interior, and in this way experienced much delay and annoyance. On my return the same year I went well into the interior to avoid these obstacles. In this I succeeded. With two routes having the same starting and objective points, and enclosing between them an elongated elliptical area, it was evident that an intermediate route on my next journey would not only be somewhat shorter, but would avoid the crevasses and steep slopes of the one route and the deep soft snow of the other. This I found to be the fact, and after the experience of the upward journey I was able to modify the return route still more with the saving of a few miles and an improvement in the travelling. A comparison of the four profiles between Whale Sound and Independence Bay is very interesting and brings out the relief of the "great ice" in a very clear manner, showing that it is really a very much flattened mountain system in ice, with its main backbone, its radiant spurs, and its intermediate valleys.

The first journey was near enough to the edge of the ice to cross the great basins of exudation, if I may use the term, and their intermediate divides, and the profile shows a succession of ups and downs like those of a railroad located along the foothills of a mountain system. The profile of the return journey of the same year shows but one depression, and that in the Humboldt Basin. The profiles of the two journeys of 1895 are ideal in that they show a rapid ascent from Bowdoin Bay to the surface of the central ice mass, and then a gradual gradient along the western slope of the continental divide till the summit is reached about 180 miles from Independence Bay, when the descent is rapid to the edge of the ice. That the crest of the Greenland continental ice divide is east of the country's median line there can be no doubt. Where it is crossed on the way to Independence Bay, it is trending away to the northwest and rapidly decreasing in altitude, to lose itself in the

landward slopes of the "great ice" near the convergence of Victoria Inlet and the northwest coast.

From this continental divide extend spurs into the Cape York Peninsula, Prudhoe Land, Washington Land, Hall Land, etc., and between these divides are the enormous basins which feed the glaciers of Melville Bay, Inglefield Gulf, Kane Basin, Petermann and Sherard Osborn Fjords. The experienced navigator of the "great ice" has, like his brother of the sea, the means of avoiding or overcoming adverse conditions. If he has come in too close proximity to the land, and finds himself among the rocks and breakers—*i. e.*, crevasses and steep blue ice slopes—he must put to sea at once—*i. e.*, swerve into the interior.

If, when well out to sea, he encounters continuous adverse winds and currents and heavy sea—*i. e.*, up grade and deep soft snow—he can avoid them by veering toward the shore, when he will at once reduce the grade, and in a short time reach hard going.

One thing very much in favor of the navigator across the northern inland ice of Greenland is the fact that he will encounter practically no head winds. The regularity of the winds of the "great ice" of Greenland, as I have found them during an actual sojourn of over seven months upon the "ice-cap," and visits to it of greater or less duration in every month of the year, is phenomenal. Except during atmospheric disturbances of exceptional magnitude, which cause storms to sweep across the country against all ordinary rules, the direction of the wind of the "great ice" of Greenland is invariably radial from the centre outward, perpendicular to the nearest part of the coast land ribbon. So steady is this wind, and so closely does it adhere to this perpendicularity, that I can liken it only to the flow of a sheet of water descending the slopes from the central interior dome to the coast. The direction of the nearest land is always easily determinable in this way; the neighborhood of great fjords is always indicated by a change in the wind's direction; and the crossing of a divide, by an area of calm or variable winds, followed by winds in another direction, independent of any indications of the barometer.

The opinion previously formed by me, that the wind with its transporting effect upon the loose snow of the ice-cap must be counted as one of the most potent factors in preventing the increase in height of the ice-cap, a factor equal perhaps to the combined effects of evaporation, littoral and sub-glacial melting, and glacial discharge, has been corroborated and greatly strengthened by my observations of the past two years. When it is remembered that

the flow of the atmosphere from the cold heights of the interior ice-cap to the lower land of the coast is going on throughout the year with greater or less intensity, and that a fine sheet of snow is being thus carried beyond the ice-cap to the ice-free land at every foot of the periphery of the ice-cap, it will perhaps be seen that the above assumption is not excessive. I feel confident that an investigation of the actual amount of this transfer of snow by the wind is well worth the attention of all glacialists.

The land clouds of the Independence Bay region were visible at least one hundred miles in upon the ice-cap, gradually rising above the snow horizon as we approached. When we reached what might be called the actual crest of the ice-cap, a point about fifteen miles from the edge, where it begins to slope down rapidly to the land, and I could make out the familiar land-marks, I found that we were approaching the land on a course about five miles east of that on which I had descended to it in '92. This difference of position resulted in a higher elevation, enabling me to look over the eastern edge of the Academy Glacier Basin and make out the summits of the east coast land ribbon considerably farther to the south than I had seen them in '92. At this time it was entirely clear on the ice-cap and along the inner edge of the Independence Bay land. Farther out was a heavy, hazy stratum, hanging at a considerable elevation over the land, beneath which I saw due north of us, and distant apparently seventy-five or one hundred miles, what had escaped observation owing to the heavy clouds on my previous trip, a magnificent mountain, massive in form and heavily buttressed, towering in savage grandeur far above the intervening cliffs and ice-caps. Apparently it was twice their height; as, however, its shape was changing under the mirage effects of these high latitudes, it is very likely that its elevation was exaggerated by the same cause. Increasing haziness soon hid it from our view, a few hours later a dull veil formed, entirely blotting out the sky, clouds sank in great leaden masses on to the land, the ice-cap took on a ghastly hue, and short, sharp gusts of wind followed each other in rapid succession down the slopes of the "great ice," and the land was reached in the midst of a roaring blizzard from the ice-cap which confined us upon the moraine for two days.

In 1892 my route from the moraine to Navy Cliff had been selected with a view to giving me as good an outlook as possible, and I had travelled intentionally along the crest of the mountains which bound the Academy Glacier on the west. Now my chief object was to get the sledges to the bay ice by the easiest practicable

route, and this meant following the valleys of the streams, where the greatest amount of snow was to be found and the grade certain to be more regular and gradual. For this reason during our work upon the Independence Bay land, hunting the musk ox and transporting the sledges and equipment to a point about ten miles north of Navy Cliff, we saw only the slopes of the valleys which formed our road. When the unpleasant fact dawned upon me that our efforts had practically been futile, and that it would be folly to proceed farther, I ascended with some difficulty to the nearest eminence to see if I could make out anything more in regard to the features of the region. Where I stood, and from there east and north-east out through the Bay, the sun was shining brightly on the unbroken expanse. From my more advanced position I could see several miles of the south shore of the Bay, a land of precipitous black cliffs trending eastward from the Cape which confined Academy Glacier on the east. Westward, north-westward and northward heavy clouds were rolling across the summits of the land from the west. The shore bluffs reached away first north and then north-east, interrupted by the two inlets which I saw in '92, until they vanished in the north-eastern distance.

The face of the Academy Glacier was advanced considerably beyond its position in '92; the surface of the Bay was smooth except for the *sastrugi* caused by the violent winds which undoubtedly rush down from the ice-cap and out of this Bay, as they do out of Whale Sound, and there were but two or three bergs in the Bay away from the immediate face of the glacier. A large tidal crack ran northward from the Cape east of the Academy Glacier.

As to the character of the northern land-ribbon in the vicinity of Independence Bay, paradoxical as it may sound, its appearance, as seen from the heights of the ice-cap, was much less forbidding than that of the Whale Sound ribbon seen under the same circumstances. This I judge to be principally the result of local orographical features, but partly also due to the reversion of the point of view.

The northern shores of Whale Sound are almost continuously bold, and the plateau above the cliffs is almost completely covered either by tongues of the main Inland Ice, as in the peninsula between Bowdoin Bay and Inglefield Gulf, or by detached ice-caps as on Redcliffe Peninsula, Herbert Island, etc., the edges of which in many places are less than a mile from the shore line. As a result the traveller, descending from the heights of the "great ice," sees only the rolling snow-domes of these tongues and isolated caps,

with the crests of the black cliffs intersecting them in irregular lines, until he has almost reached the edge of the ice, and is able to look down into the bays and see the warm but contracted slopes along their shores and the little valleys at their heads.

The Independence Bay land on the contrary is, though elevated, rolling and devoid of ice-cap, and broad areas of the red and dark-brown land surface meet the eye.

Another thing in favor of this region is that it is approached from the front, as it were—*i. e.*, from the south—while the other is approached from the back, or the north.

The geological features of the country are practically the same as those of Whale Sound and nearly, if not every, feature of the one region could be duplicated in the other. The lateral moraine of the "great ice" at Independence Bay contains the same rocks and has the same appearance as that at Bowdoin Bay; the level tops of the high mountains and ridges show the same hard, compacted gravel surface (as if formed by a heavy road-roller) that can be seen on the Redcliffe Plateau back of Cape Cleveland; the eastern slopes of Heilprin Land remind me very strongly of the southeastern shore of McCormick Bay; and the giant cliffs which tower over the Academy Glacier, though much higher, resemble strongly those in Academy Bay.

Dark granite and gneissose cliffs and trap dykes, running in various directions, may be seen here as about Whale Sound.

Wave-marked slabs of red sandstone, identical in color and size of markings to those which I have picked up on the shore of Bowdoin Bay, I saw over 3,000 feet above the sea on the Independence Bay land.

The country east of the Academy Glacier, with the dark cliffs surcharged with a continuous ice-dome, would, but for the absence of exuding glaciers, be strikingly similar to the shore of Whale Sound, between Ittibloo and Netiumi, while the Independence Bay peninsula proper resembled the country between Inglefield Gulf and Orluks Bay. In fact, the whole country seemed familiar, but with an increased barrenness, savageness and sombreness, as might be expected from four additional degrees of latitude.

Yet again, paradoxical as it may seem, I was struck by the greater abundance of flowing water not only on the land, but along the edge of the ice-cap, in this latitude as compared with Whale Sound.

In 1892 the zone of wastage along the northern edge of the ice-cap was as wide as it was at McCormick Bay, and much wider than

it was either season at Bowdoin Bay. And in 1895 the slopes of the "great ice" for several miles in from the moraine at Independence Bay, were free from snow and showed only hard blue ice, while at Bowdoin Bay the deep snow lay even partly over the moraine.

The Academy Glacier, while showing in its upper portion and around the circumference of its great névé basin, features similar to those of the glaciers of Jacobshavn and Tossukatak in Disco Bay, and the Heilprin and Tracy glaciers in Inglefield Gulf, in its lower portion showed peculiar features like those noted by Dr. Copping in the Petermann Glacier.

For several miles from the extremity of the glacier the ice-stream is intersected by great vertical-walled canals, in which the water has frozen many feet below the glacier surface. As may be imagined, the discharge of the glacier is controlled by these canals, and instead of fragments of ice and icebergs, as we understand them, great fields of the glacier, miles in extent, are detached and gradually move out into the bay.

The uniformly smooth surface of the bay ice might be accounted for in two ways, either on the assumption that the ice did not break up every year and that the combined effects of partial surface melting in summer, and the drifting snow of spring and fall, would smooth all irregularities; or that it does break up and the moment it is loosened, is driven out to sea by the wind which is always blowing out of the bay. The absence of icebergs in the bay both seasons, except near the end of the glacier, inclines me to the latter idea.

The wide tide crack seen extending northward from the Cape east of Academy Glacier both years; and the mottled appearance of the bay ice in the summer of '92, strengthens this belief.

Small lakes and ponds are numerous over the land and rushing brooks in summer time are everywhere. The presence of nearly continuous sharply marked tumuli and embankments of moraine material, miles in advance of the present edge of the "great ice," indicate more clearly than I have noticed anywhere to the south, the undoubted retreat of the ice from a considerable area of terrene.

The details of our return journey from Independence Bay, like those of the upward journey, have already been given in these pages, and it is not necessary to go over them again. Somewhat recuperated by the liberal rations of musk ox meat, men and dogs fortunately started on the return journey in fairly good condition, and were thus enabled to make the ascent of nearly 8,000 feet to the

crest of the "great ice." From this point on, a practically level surface, the absence of storms, the perfection of our equipment, and the use of every expedient known to the Eskimo, or which our own ingenuity could devise, to decrease the friction of our sledges and increase the tractive force of ourselves and dogs, enabled us to travel at speeds from $1\frac{1}{2}$ to 2 miles per hour and to continue these speeds from ten to twelve hours at a time, depending upon the character of the snow. Any sudden or increased exertion, however, would invariably be followed by bleeding at the nose, and a weakness which would compel us to stop and rest. Fortunately for us no ice-cap blizzard occurred during the return march, and we eventually reached the Lodge with all our provisions consumed and one dog out of the forty-one with which we started at the beginning. While this journey cannot be said to have added much to the information gained during the previous trip of '92, it has completed the conquest of the inland ice, and has shown that with the proper supplies and the right kind of men, Greenland can be crossed with safety at any point in a single summer.

Had the discoveries of the first journey across the ice-cap from Whale Sound to Independence Bay been combined with the perseverance and the determination under the most serious handicaps of the second journey, the result would I believe have made the work *facile princeps* among all Arctic journeys.

After we had recovered from the strain of the journey and while waiting for the arrival of the ship, some more work of surveying was accomplished and additional material obtained for the chart of Whale Sound, which accompanies this paper.

This chart is an accurate representation in considerable detail of one of the most interesting of Arctic inlets.

Primary points on it have been determined by astronomical observations, secondary ones by triangulation, and the connecting shore lines run in by an odometer and railroad compass traverse.

Several changes have been made in the contours of shore lines, positions of islands, etc., between Cape York and Cape Alexander, which will be given after my photographic records have been collated.

Material has also been obtained for an interesting chart of the entire region with the native nomenclature.

Other interesting items of work in the Whale Sound region are the determination of the rate of motion of one of the larger glaciers; photographic studies of glaciers, consisting of series of photos of each glacier from the same point covering a period of

three years; and the use for the first time, as far as I know, of the barograph and thermograph in Arctic work, by which very interesting sheets of continuous records have been obtained.

The visit of my ship to Jones Sound on the homeward voyage showed discrepancies between charts and actual coast, but the stay of the ship was so short that I have not felt justified in changing existing charts, though the discrepancies are evident to the most superficial eye.

Among other things which I believe my work in North Greenland has established conclusively are; that sledge journeys may be undertaken and carried out by Europeans with safety at any period of the Arctic night; that Europeans can remain in those latitudes for an indefinite time without being troubled by that ancient dread of Arctic explorers—scurvy; that small parties are the only ones suited for effective work in the Arctic regions; that the "great ice" of Greenland is beyond a doubt an unbroken deposit covering the entire interior from north to south and from east to west; and that the mainland mass of Greenland ends between the 82° and 83° parallels, while beyond that is an archipelago of uncertain extent reaching to the northward and north-eastward.

In my various expeditions I have introduced for the first time and determined the feasibility of numbers of novel features of pronounced value to the practical explorer; as, for example, the design for winter quarters; the use of the odometer, the barograph and thermograph, the discarding of the hitherto indispensable sleeping bag.

I believe my methods and equipment especially adapted for Antarctic work as well as Arctic work.

The studies of sledge construction and the designs for clothing have been carried to exhaustive lengths.

Finally I feel that I am justified in considering myself responsible for this last renaissance of Arctic interest, which started by my efforts of five years ago is still increasing in volume and intensity; and for the practical demonstration of the fact that Arctic exploration can be prosecuted upon a very economical basis, and *without loss of life.*

WASHINGTON LETTER.

WASHINGTON, MARCH 26, 1895.

The chief characteristics of what remains of the public domain of the United States are clearly and concisely described by Mr. F. H. Newell in a novel and interesting report entitled "The Public Lands and their Water Supply."* The relative location and area of this domain is shown by a large colored map. The proportion in each State and Territory is illustrated by means of diagrams.

There is still vacant and open to settlement within the boundaries of the United States (not including the Territory of Alaska) an area comprising nearly 630,000,000 acres, or one-third of the total extent of the country. Within this vast extent there is an unknown area—amounting to scores of millions of acres—of forests and wooded lands.

The relative area of the various classes of public lands as compared with the whole land area of the United States is shown by the following table:

	SQUARE MILES.	ACRES.	PER CENT.
Vacant public lands.....	980,337	627,415,680	33.01
Indian reservations.....	131,689	84,280,960	4.43
Forest reservations.....	30,445	19,484,800	1.03
Lands disposed of.....	1,107,044	708,508,160	37.27
Area of older (19) States.....	458,195	293,244,800	15.43
Area of Texas.....	262,290	167,865,600	8.83
	2,970,000	1,900,800,000	100.00

Of the vacant public land, 17,166,080 acres are in the eastern part of the United States, the remainder is in the west, and mainly within the arid regions. The forest reservations are a new institution, having been created by Act of Congress of March 3, 1891.

By far the greater portion of the vacant public lands—over 95 per cent.—are classed as arid or semi-arid in character, and depend for their future value not so much upon altitude, mineral contents,

* Extract from the 16th Annual Report of the United States Geological Survey.

or geological structure, as upon the presence or absence of water. It is a fact now generally recognized that, owing to the scarcity of water, only a small proportion of the now public domain can be reclaimed for agriculture, but this amount, though small when compared with the whole area, is in the aggregate larger than the territorial extent of some of the States, and will sustain a population numbering millions.

Of the public land States,—that is to say, all States excepting the thirteen original, and six States subsequently admitted into the Union within whose limit the Government had no public land,—there are four in which all the vacant land has been disposed of. These are Illinois, Indiana, Iowa, and Ohio. The amount undisposed of in each of the remaining States and Territories varies very widely,—all the way from 1 to 99 per cent. of their respective areas. The public lands lying east of the 97th meridian,—a convenient central vertical line,—are well watered, while the greater part to the west are arid and almost desert-like. Judging from the past rate of disposal in the eastern division, it is safe to assume that within a decade the amount of vacant public land in these States will be insignificant. Over half of the vacant area lies in Arkansas and Minnesota, and in all the States of this division the tracts are, as a rule, widely scattered in relatively small bodies.

In the area west of the 97th meridian the greatest amount of public land is in Montana. The greatest proportion, however, is in Nevada, where, according to estimates, over 95 per cent. of the total area is still at the disposal of Congress. Next in the order of extent of vacant lands is California, with a little more than one-half the total area of the State. The smallest area in any western State is in Kansas—less than 2 per cent. More than three-fifths of the entire area of western public land States consists of open, treeless country.

In the western division the Government Reservations, so-called, occupy 162,134 square miles. The reserves are (1) Indian reservations (82,708,797 acres). These lands are being steadily diminished year by year, being in many cases allotted in severalty to the Indians, and the balance thrown open to settlement by the whites. (2) Forest reservations. This is a novel undertaking here, and somewhat in the nature of an experiment. Since the law providing for them went into effect (March, 1891), seventeen reservations, having an aggregate of 17,564,800 acres, have been set off. They are located in California, Colorado, Oregon, Washington, Wyoming and Arizona. There are none in the eastern part of the United

States owned by the National Government, but the State of New York has instituted a great park or forest reserve in the northern part of its domain. It is not unlikely that many of the older States will adopt this course, not only for supplying timber, but unpolluted water. (3) Military reservations. Of these the total extent is about 1,500,000 acres, lying almost entirely in the western public land States. These military reservations are abandoned from time to time, and eventually form part of the vacant public lands.

In the nature of "reservations," although not by the Government, are the immense tracts granted to railroad corporations, aggregating nearly 50,000,000 acres. These railroad lands extend in broad belts across the country, beginning at the 95th meridian, and include some of the most valuable areas within the States traversed. Through California and Oregon the belt trends north and south.

The main point developed by this report is that the value of the lands of this unoccupied third of the United States is dependent primarily upon the water supply. Much of it has been reclaimed by irrigation, but by far the greater portion cannot be irrigated, and has value mainly for pasturage and for forest growth.

FORESTRY.—The National Academy of Sciences, at the request of the Government, has had under consideration the matter of forest preservation. A commission consisting of notable scientific men has been informally designated to make an investigation of the subject in all its phases. The personnel of the commission is as follows: Charles S. Sargent, Alexander Agassiz, Henry L. Abbott, Prof. William H. Brewer, Arnold Hague and Mr. Gifford Pinchot. In addition to these Prof. Walcott Gibbs, President of the Academy, is an ex-officio member of the commission. All of these gentlemen will be recognized as having qualifications of the very first order for the contemplated investigations.

This is not a national forestry commission, clothed with authority to adopt measures for the preservation of forests on public lands. Its powers are limited to investigation and suggestion. The Academy is required under the terms of its charter to furnish the Executive Departments of the Government or Congress information and advice on questions of practical science when requested to do so. The request for this investigation originated with the Forestry Association during the session of the American Association for the Advancement of Science, last fall. The Secretary of the Interior was selected as the medium of communication

with the Academy of Sciences. The Secretary requested an official expression of opinion upon the following points:

1. Is it desirable and practicable to preserve from fire and to maintain permanently as forestry lands those portions of the public domain now bearing wood growth for the supply of timber?
2. How far does the influence of forest upon climatic soil and water conditions make desirable a policy of forest conservation in regions where the public domain is principally situated?
3. What specific legislation should be enacted to remedy the evils now existing?

The names of the men who have been appointed on the Commission are certain guarantees that any report made after personal investigation in the field will command the respectful attention of Congress and of the public. Mr. Sargent is the author of *The Sylva of North America*, the finest of all works on trees yet published. He is also the author of *Reports on the Forest Trees of North America*, which formed (with an atlas) one of the monographs of the 10th Census. He is a professor at Harvard and director of the Botanical Garden and Arnold Arboretum. He was also chairman of the Adirondack Forest Commission of 1885. Alexander Agassiz has had extensive experience in California and the West, and was formerly Curator of the Museum of Natural History, Harvard. He is regarded as the first living authority on many subjects of natural history. Henry L. Abbott of the Corps of Engineers, U. S. A., has been connected with the surveys for the Pacific railroads and the Mississippi delta. He invented and developed the system of submarine mines for coast and river defense. His knowledge of the river system of the United States is very remarkable. Prof. Brewer was engaged in the geological survey of California; a professor of chemistry in California, and editor of *Botany*. He is now professor of agriculture at Yale College. Gifford Pinchot has had special training in foreign schools of forestry. He spends most of his time on Mr. Vanderbilt's estate, Biltmore, near Asheville, N. C., experimenting in practical forest economy. Arnold Hague, now of the Geological Survey, has been engaged on the survey of the 40th parallel, and on geological work in California and Utah.

Senator Teller's bill to protect public forest reservations provides that no public forest reservations shall be established except to improve and protect the forest within the reservation or for the purpose of securing favorable conditions of water-flow, and to insure a continuous supply of timber for the people of the States wherein such forests are located; but it is not his purpose to include

in forest reservations lands more valuable for mineral or agricultural purposes, and to this end his bill provides that any public lands embraced within the limits of any forest reservation which shall be found better adapted for mining or agricultural purposes than forest uses, may be restored to the public domain, and prospectors and mineral claimants shall have access to such forest reservations for the purpose of prospecting, locating and developing mineral resources.

BOARD OF IRRIGATION.—The latest development of the irrigation inquiry is the "Board of Irrigation, Executive Departments," established by authority of the Secretary of the Interior and Secretary of Agriculture, March 26, 1895. The objects of the Board are the correlation of the several lines of distinct yet related work for irrigation carried on by different departments of the Government, and the discussion and rendering of opinions upon such matters pertaining to irrigation as may be brought before the Board. Its functions are advisory as regards the interpretation and execution of Federal laws concerning irrigation, and also as to coöperation and specialization of work in various bureaus.

The membership of the Board consists of the Director of the Geological Survey, C. D. Walcott; the Chief of the Weather Bureau, Willis L. Moore; the Commissioner of Indian Affairs, Dr. M. Browning; the Ass't Commissioner of the General Land Office, E. A. Bowers; the Chief of the Office of Irrigation Inquiry, C. W. Irish; the Chief of the Hydrographic Division of the Geological Survey, F. H. Newell; the Chief of the Division of Agricultural Soils of the Dep't of Agriculture, Milton Whitney; the Chief Topographer of the Geological Survey, Henry Gannett; the Chief of the Forestry Division, Dep't of Agriculture, B. E. Fernow; the Chief of the Division of Vegetable Physiology and Pathology, Dep't of Agriculture, B. T. Galloway.

Following its line of duty, the Board resolved to prepare brief statements of the following: (1) Existing legislation relative to irrigation; (2) the work hitherto done by the various divisions, whether published or unpublished; (3) the lines and methods proposed to be pursued by each division for the future; (4) the deficiencies and difficulties experienced which might be remedied by coöperative action.

The first three points have been covered by a Preliminary Report, recently printed, which includes also a bibliography of official reports on irrigation, 1879 to 1895. An examination of this bib-

liography reveals the fact that Government methods in dealing with great economic questions are not always of the first order; for on this subject of irrigation alone one finds at different periods reports from the State, War, Treasury, Interior and Agricultural Departments, Special Agents, Census Office, Senate Special Committees, Commissioner of Indian Affairs, Geological Survey, Bureau of Statistics, Signal Office, Corps of Engineers, and one or two Special Commissions. At the present time the subject is under treatment both in the Interior and Agricultural Departments. The creation of this Board for the purpose of "correlating the several lines of distinct yet related work for irrigation carried on by different departments" would seem to have been too long delayed.

DEEP WATER-WAYS.—A bill was recently introduced in both the Senate and House, that comprehends a great public benefit and does not demand either a loan or a subsidy. All that is asked is a charter under the name of "Maritime Canal Company" to construct a ship canal not less than 300 feet wide and 26 feet in depth to connect the Great Lakes with the Atlantic. If permission is granted, the Company agrees to complete a canal in ten years, all on American soil, that will make an ample ship route from Chicago to New York City by way of Lakes Michigan, Erie and Ontario, the St. Lawrence River, Lake Champlain and the Hudson River. There are some well-known names among the incorporators.

Simultaneously there is another bill directing the Secretary of War to cause to be made accurate surveys and final estimates of cost of construction of a ship canal by the most practicable route wholly within the United States, from the Great Lakes to the Hudson River, of sufficient capacity to transport the tonnage of the lakes to the sea, and appropriates \$50,000 for the purposes of the survey.

There is also pending a bill to incorporate the Lake Erie and Ohio River Ship Canal Company, to facilitate commercial intercourse by water between the Great Lakes and the Ohio and Mississippi rivers. The first name in the list of corporators is that of Andrew Carnegie.

Also a resolution to print for Congressional use an edition of the "Proceedings of the first annual convention of the International Deep Water-ways Association," a volume of 464 pages which traverses the "deep water movement" from the first proposition made one hundred and seventy-five years ago to the present time.

It is proposed to appoint a commission under the direction of the Secretary of War to survey the route for a ship canal from the

lower shore of Lake Michigan to the Wabash River, one terminus of which shall be the great harbor of Chicago, and which shall be navigable to the Wabash and the larger rivers flowing to the Gulf of Mexico by the way of the mouth of that river. There have already been two surveys of the main line of this route; one by Col. Stansbury in 1832, the other by Major Gillespie in 1876. Both these surveys fulfilled the requirements of science, but they were made with reference to an ordinary canal, securing a depth of from $4\frac{1}{2}$ to 5 feet of water. The proposed canal route runs through a portion of the country destined to be the most densely settled part of the Union west of the Alleghanies. It will afford the most direct route without breaking bulk from the Lakes to the Gulf. From a military point of view its importance can hardly be over-estimated.

CRIPPLE CREEK DISTRICT, so called, the scene of recent remarkably geographic development, by reason of phenomenal gold production, lies between Beaver and Oil creeks, two tributaries of the Arkansas River. It covers an area of six miles in length by five and a half in width, from seven to twelve miles southwest of Pike's Peak, in the western part of El Paso County, Colorado. It is near the centre of the territory embraced in the Pike's Peak sheet of the Geologic Atlas of the United States. The general elevation of the district is 9,000 to 10,800 feet above sea-level. The creek from which the town and mining district derives its name is one of the numerous branches of Oil Creek which cut deep canyon gorges on the way to the main stream.* The mining camp is reached by waggon roads from Florissant and Divide on the north, from Colorado Springs on the east, and from Canyon on the south. Recently railroads have been built into the district.

That part of the State has been well known to miners and ranchmen for many years. Thousands of prospect pits and trenches dot the slopes of hills on all sides, showing futile efforts at earlier dates to discover the precious metal which has been latent for ages.

The district is essentially a producer of high-grade gold ores. Some of the mines ship no ore averaging less than \$100 per ton; a few have a production averaging over \$200 per ton, and if rumors are true, very much more. Successful mining was started in 1892. In 1894 the number of mines more or less developed amounted to over 100, and the product to that date was over \$7,000,000. The town of Cripple Creek is incorporated, and has telegraphs, electric lights,

* Geology and Mining Industries of Cripple Creek District; by Whitman Cross and R. A. F. Penrose, Jr.

daily papers, large hotels, etc. Outside of Cripple Creek are numerous smaller settlements and towns, so that the total population of the district is estimated at 15,000.

MINERAL RESOURCES OF THE UNITED STATES, 1894.—The form of this volume changes this year from ordinary octavo to the royal octavo. It has been divided into two volumes, and forms Parts 3 and 4 of the always attractive Annual Report of the Geological Survey. Part 3 is devoted to the mineral products which are chiefly sold in metallic form. Part 4 treats of non-metallic minerals and such metallic compounds as find direct use without preliminary reduction to the metallic condition. The treatment of subjects is wide and very generous; by no means confined to productions in the United States, but including geographic discussion of the mineral resources of the world. The charts, diagrams and maps are of special interest.

New York, formerly one of the most important of the iron-producing States, has fallen to the lowest rank of which there is record, viz., tenth. Michigan and Minnesota are now the great producing States, the product of the latter showing the greatest increase.

STATUS OF THE PACIFIC CABLE.—Following the failure in the House of Representatives of the amendment attached by the Senate to the Diplomatic and Consular Appropriation bill in February, 1895, which amendment authorized the President to contract for the entire work of laying a telegraph cable between the United States and the Hawaiian Islands, the President of Hawaii on the 12th of August approved an act which had been passed by the Legislature, "to facilitate the construction and maintenance of telegraphic cables in the Pacific." It was an enabling act, and authorized the President of the Hawaiian Republic to contract with persons, corporations or governments for constructing, maintaining and operating telegraphic cables with the countries bordering on the Pacific Ocean. Closely following on this act a concession was granted to Z. S. Spalding "for laying, working and maintaining submarine telegraph cables from San Francisco to Honolulu and the several Hawaiian Islands," with exclusive right and subsidy for twenty years. It is provided in the concession that the construction of the cable shall begin on or before May 1, 1897, and be completed not later than Nov. 1, 1898. It is stated that Mr. Spalding and his associates are men of probity, enterprise, business ability and of sufficient means. He is well and favorably known in Honolulu, where he has large business interests, in the United States and

England. The amount of subsidy granted, dependent upon the United States joining in this undertaking by granting substantial assistance, is \$40,000 per annum.

Following this the Pacific Cable Company was organized under the laws of New Jersey, and is the successor and assign of Mr. Spalding's interest. Among the stockholders are A. S. Hewitt, D. O. Mills, G. M. Dodge, F. D. Grant, Wager Swayne, Z. S. Spalding and others.

Soon after the opening of the present Congress, in December, 1895, Mr. McCormick introduced into the House of Representatives a bill "To provide for telegraphic communication between the United States, the Hawaiian Islands and Japan"; and in January of the present year Senator Hale of Maine introduced a bill "To facilitate the construction and maintenance of telegraphic cables in the Pacific Ocean for the use of the Government in its foreign intercourse." This bill gives the Postmaster-General authority to contract with the Pacific Cable Company for transmission by electrical means between San Francisco and Honolulu of all messages on the business of the United States for twenty years, from July 1, 1897, and the United States is committed to the subvention in round numbers of about \$250,000 per annum. The Government reserves the right to take over the ownership of the line at any time before the expiration of twenty years.

Mr. McCormick's bill proposes to give to a company of the same name—Pacific Cable Company,—but organized under the laws of New York, the privilege of constructing and operating telegraph lines from a point or points of the Pacific coast to Pearl River Harbor in the Hawaiian group, and from Pearl River Harbor to such other islands in the Pacific Ocean and Japan as it shall be authorized to connect by lines or cables. The United States agrees to pay during twenty years from the completion of the cable the yearly sum of twenty-five dollars per nautical mile, not to exceed 7,250 miles, or \$181,250.

These projects have not yet been acted upon by Congress, and although no immediate outlay of money is contemplated, it is not unlikely that political necessities may demand postponement.

ALASKA BOUNDARY.—Mr. Squire in the Senate (January 3) and Mr. Pitney in the House (February 12) made statements concerning the status of this question.

The occasion giving rise to the statements was a resolution reciting that in view of the expediency of forthwith negotiating a

convention with Great Britain for marking convenient points upon the 141st meridian of west longitude where it forms the boundary line between Alaska and British North America, and to enable the President to execute the provisions of such convention without delay when concluded, the sum of \$75,000 be appropriated to defray the share of the United States in the joint expense of locating the meridian and marking the boundary by an international commission.

The Alaskan boundary is conveniently divisible into two sections. The first, where it follows the contour of the coast from the southern-most point of Prince of Wales Island until it strikes the 141st meridian at or near the summit of Mount St. Elias; the second, where it is formed by the 141st meridian, which it follows from that intersecting point to the frozen ocean. The preliminary survey of the first section by Joint Commission has been going on since 1893, and is now completed, but up to the present date no report of its conclusions has been presented to our Congress. When so presented it can only present data for the information of the respective Governments, upon which when the entire examination shall be completed the two nations may be duly advised, so as to enable them more intelligently to enter into a treaty. It is stated, however, on authority, that the American surveys have demonstrated the fact that there is no range of mountains such as at the time the treaty was concluded between Russia and Great Britain was assumed to exist, and no range of mountains to which the language of the Russian treaty of 1867 can apply. Therefore, the claim on behalf of the United States is and must be that the Territory of Alaska, that is to say, the southeasterly portion of it, shall be bounded to the eastward by a line distant 10 marine leagues from the coast, following the windings of that coast.

The second section is the true location upon the surface of the earth of the 141st meridian, to be ascertained by astronomical survey. The meridian has been located upon the principal water courses which form the highways by means of which miners and other immigrants enter the country,—such as the crossing of Forty Mile Creek, and at the Yukon River. Much time and care is still required to secure the accuracy of observations already made, and to reduce errors to so small a degree that they will be practically immaterial. It should be understood that the Commissions of the two Governments who have been working on this matter have authority only to examine, survey and report. They were not created for the purpose of coming to any agreement so as to bind their Govern-

ments. The data collected will afford the basis for a treaty between the United States and Great Britain relative to the southeastern boundary, and it is not unlikely that a convention for this purpose and for marking convenient points upon the 141st meridian is near at hand.

It is proposed that the Coast Survey by proper reconnoissance ascertain whether there is not a southern channel entrance to the Yukon River for sailing vessels, which would obviate the necessity for going as far north as Norton Sound, at which point freight and passengers are now transferred to Yukon River steamers, and also make a thorough survey of the mouth or mouths, if more than one, of said river.

A bill pending in Congress provides for the election of a delegate to that body from Alaska. The Territory now has a population much larger than had twelve Territories (now States) at the census nearest the date of their organization as Territories. The business of Congress as well as of the Departments is increasing to such an extent that an accredited agent or delegate is almost an imperative necessity.

NORTHERN BOUNDARY.—The President is to be requested to enter into negotiations with the Government of Great Britain for the adjustment of the part of our northern boundary between Lake Superior and the Lake of the Woods. There has never yet been a complete survey, location and mapping of this line. The treaty of 1783 defined it only in general and uncertain terms; the treaty of 1794 pledged a joint survey in that quarter; the treaty of 1815 made provision for a commission for the purpose; the treaty of 1842 recited with some particularity the names of several lakes and their connecting waters as forming such boundary. Dispute concerning the ownership of certain islands along the boundary, and the prospective rapid development of the adjacent country, have brought prominently forward the necessity for an accurate survey.

NEW EXPLORATIONS.—One of the bits of exploratory work initiated in Washington last year was that of W J McGee, ethnologist-in-charge of the Bureau of American Ethnology. Leaving Washington toward the end of October, he outfitted at Tucson and proceeded thence through southwestern Arizona and western Sonora to the country of the Seri Indians, comprising Tiburon Island in the Gulf of California, and a considerably larger area on the adjacent mainland. On the island are 500 square miles of territory

and on the mainland 2,500 more. The entire tract is mountainous. Tiburon Island embraces half a dozen ranges with peaks of 3,000 to 4,000 feet.

He was accompanied by Mr. Willard D. Johnson, one of the best known and most skilful topographers of the U. S. Geological Survey, who made a plane-table survey of the territory traversed by the party.

The entire region is arid, and portions are uninhabitable desert, and for this and other reasons it has never been surveyed. There is but one feeble stream, and its waters are evaporated before reaching the Gulf. There are some springs, but they are widely separated. The party carried water from seven to fifteen miles to their various camps from these springs. In addition to natural obstacles, the portion of the area known as Seriland has been defended against white invasion by the blood-thirsty inhabitants so effectively that their mountains and valleys have hardly been seen by white men, save from a distance, or from vessels coasting the adjacent waters. The expedition spent about a month in Seriland, making topographical surveys and collecting archæologic and ethnologic data, though the natives, always warlike, were so exceptionally hostile that they kept out of the way of the explorers. They were seen on the borders and photographs of them were occasionally secured, but after the party entered their land the savages kept out of the way. They would abandon their homes and towns as the initial party of explorers approached.

The Seri Indians have been known since the time of Coronado as savage warriors, using poisoned arrows, and they are generally thought to be cannibals. This, however, Mr. McGee doubts, but he is certain of their desire to kill all men except their own. They have a few guns, and occasionally a man with a hat is seen, but these are the ones nearest the border. During the historic period, their number has diminished through constant warfare from about 2,000 to 350 or less, mostly women and children. They are entirely without agriculture, and live largely on sea-food, commonly eaten raw; they navigate the adjacent waters in reed canoes, use the bow and arrow effectively, and wear short skirts, sometimes supplemented by robes or blankets, both made of pelican skins. They are of large stature, and are remarkable for strength, speed and endurance. In physical characteristics, language, arts, and habits of life, they appear to be distinct, constituting a separate stock or family. They are the most irreconcilable to civilization of any savages on the American continent. From historical rec-

ords it is known that the Seri have been engaged in practically continuous warfare against all peoples for two or three centuries, and their archæology and some of their characteristics and customs indicate that they have been inimical to neighboring tribes for many centuries.* They are greatly dreaded by the Mexicans as well as by the other native tribes, and will undoubtedly become extinct at an early day.

The 14th Annual Report of the Bureau of Ethnology, which is now in the printer's hands, will comprise two parts instead of one, as hitherto. The first part will consist almost wholly of a memoir on "The Menomini Indians," by Dr. W. J. Hoffman. This tribe was found by Nicolet in 1634, but has thus far received no scientific attention. The work will embrace an exposition of ceremonials of initiation into the Cult society, generally designated as the Grand Medicine society, and will be a completion of the same work rendered with reference to the Ojibwa Indians, which was for the first time made public by the same writer in the 7th Annual Report. The present memoir will embrace also the mythology, social customs, totemic organization, arts and manufactures, and will conclude with a comprehensive vocabulary, with critical notes on Menomini geographic terms.

The second part of this report will contain an account of Coronado's journey to Cibola and the Great Plains in 1540-1542, with all the Spanish documents, and English translations, notes, and a bibliography, by George Parker Winship. Also, The Ghost Dance, by James Mooney.

The 13th Annual Report, which is nearly off the press, contains the following interesting papers: (1) Prehistoric Textile Fabrics of Eastern United States; by W. H. Holmes. (2) Stone Art; by Gerard Fowke. (3) Aboriginal Remains in Verde Valley, Arizona; by Cosmos Mindeleff. (4) Omaha Dwellings, Furniture, and Implements; by J. Owen Dorsey. (5) Casa Grande Ruins; by Cosmos Mindeleff. (6) Zuni Creation Myths; by F. H. Cushing.

Mr. F. W. Hodge, of the same Bureau, is preparing for publication an index of the six quarto volumes of Schoolcraft's great work on the Indian Tribes of the United States. It will contain approximately 25,000 references.

GEOGRAPHIC NAMES.—The United States Board on Geographic Names announces decisions from October, 1895, to March, 1896.

* *American Anthropologist*, March, 1896.

There are 262 in all. The following corrections, alterations, or changes occur in New York:

Bemis Heights, Saratoga County.—Not Bemus Heights.

Blodget; hill in Coeymans, Albany County.

Brunswick Center, Rensselaer County.—Not Center Brunswick.

Chuctanuda (North and South); two creeks in Montgomery County.

Crandell Corners, Washington County.—Not Crandall's Corners.

Cropseyville, Rensselaer County.—Not Cropserville.

Feurabush, Albany County.

Feuri Spruyt, Albany County.—Not Spraight Kill.

Gardiniers Island, east of Long Island.—Not Gardner.

Glenmont, Albany County.—Not The Abbey.

Halfmoon, Saratoga County.—Not Half Moon.

Haynersville, Rensselaer County.—Not Haynerville.

Lauson, Albany County.—Not Lawton.

Putts; creek in Essex County.—Not Putnams.

Quackenkill, Rensselaer County.

Slingerlands, Albany County.—Not Slingerland.

Tackawasick; creek in Rensselaer County.—Not Ts-ats-awassa, nor Cummings.

Vloman; kill (or creek), Albany County.—Not Vlamans Kil, nor Vlauman Kill.

The Board decides that the name of the Argentine Republic in South America is Argentina.

OCEAN TRAVEL.—General J. A. Dumont, the Supervising Inspector-General of Steam Vessels, recently made the following interesting statement for the information and possible relief of mind of timid persons who fear to make an ocean voyage, or if they do so, and while on board a steamer, are in constant trepidation, to the discomfort of themselves and their associates on such a voyage. He said:

"A comparative statement of the dangers by land and sea, as shown by official records on the subject, shows that as a rule life is safer to-day on an ocean steamer than when travelling by railroad or any other vehicular mode of travel; in fact, safer than is pedestrian travel in large cities, or while engaged in the ordinary employments of life on land. For instance, in the twenty years ending June 30, 1895, there were reported 100 ocean and coastwise steamers lost. Total number of lives lost, 776, or an average loss per annum of less than 39 persons, while on the railroads of the United States during the five years ended June 30, 1894, there were killed, as reported at the Interstate Commerce Commission, 34,304 persons, including passengers and employees, or an annual average of 6,861 persons killed.

There are no statistics in this country, that I am aware of, from which data can

be obtained as to the number of people killed in general employments, but I am informed that Germany keeps a record of all accidental loss of life among workmen, and I have seen an apparently authentic statement in a newspaper lately that the German records show a loss of life from accidental causes of 39,000 workmen from October 1, 1885, to December 31, 1893, a period of eight years and three months, or an annual average of 4,727 such persons, which annual average is over six times the number of persons, passengers, and employees lost on ocean steam vessels in twenty years.

While the above statements show that there is no absolute preventive against accidental loss of life, either on land or water, they also show that the United States, by its beneficent laws and faithful execution thereof by its duly appointed officers, has reduced the losses of life on steam vessels to a minimum not reached by any other maritime nation."

MARINE CONFERENCE.—It is proposed to convene the delegates of the United States to the late International Marine Conference to reconsider the revised international rules to prevent collisions at sea. In 1894 an understanding was reached by the principal maritime Powers that these rules should go into effect March 1, 1895. This understanding was broken by a change of position of the British Government, which in January, 1895, notified the United States that until Parliament had been consulted it could not agree to the date fixed. Several other nations also withdrew their assent, and by act of Congress the date was postponed. It is expected that the final views of the British Government will be received soon. The object of the reconvention is to consider whatever amendments may be proposed and report its conclusions to Congress for final action.

AERIAL NAVIGATION.—It is proposed to award \$100,000 from the Treasury of the United States to any person who shall prior to the year 1901 construct an apparatus that will demonstrate the practicability of safely navigating the air, at a speed of not less than 30 miles an hour, and capable of carrying passengers and freight weighing at least 400 pounds. Also \$25,000 for an apparatus that will demonstrate the practicability of safely navigating the air in free flight toward any desired point of the compass for a distance of one mile or more in a descending line; the point of alighting to be not more than 65 feet lower than the point of starting. No use to be made of any gas lighter than air.

HISTORICAL.—Senator McMillan has a bill before Congress appropriating \$25,000 for the preparation and publication of the Revolutionary Archives in the Department of State. Senator Daniel has another, appropriating \$20,000 for the purchase of the

papers and correspondence of Jefferson, now in the possession of his great-grand-daughter. Senator Chandler, still another appropriating \$10,000 for the unpublished correspondence and manuscripts of Monroe known as the Gouverneur collection. Numerous petitions have been circulated asking for the publication entire and complete of the Journals of the Continental Congress.

INDIANOLA TERRITORY.—Congress is considering the advisability of creating a territorial form of government, by the name of the Territory of Indianola, for the Five Civilized Tribes now occupying the Indian Territory; the right of suffrage to be accorded to all male citizens and Indians over the age of twenty-one years who are actual residents of the Territory.

NOTES.—The Venezuelan Commission recently received the report of Justin Winsor, who was intrusted with the difficult task of going over 300 maps of the Venezuela-Guiana territory. These maps came from all available sources, including the collection of the State Department, Congressional Library, etc. Mr. Winsor has been tracing back these various maps to establish the basis and authority for them. This has resulted in eliminating a great part of them, as they were reprints. The conclusions of Mr. Winsor are regarded as important in the development of the case.

The representatives of various governments which make decennial enumerations of the people are making efforts to secure uniformity in the inquiries to be used in future censuses. It is proposed in Congress that the Commissioner now in charge of the United States Census correspond with the census officers of other countries for the purpose of securing such uniformity, and also report a plan for a permanent census service.

A Washington branch of the American Institute of Archæology was recently organized. The objects of the society are, in the main, those of the general society, whose headquarters are at Boston, to wit, the prosecution of archæological research in this country and abroad, and the formation at Rome of an American Society similar to that now in operation at Athens. Secretary, Dr. A. P. Montague, of Columbian University.

In the interest of good roads Representative C. W. Stone proposes (by bill) to create a special commission on highways to consider the expediency of, and best methods of, providing for the scientific location of highways on the public domain; the employment of the Geological Survey in the discovery of road materials; the free testing of all road materials offered; the construction of

model roads and instructions in road-making. The National League of Good Roads, and the League of American Wheelmen, both strong organizations, are strenuously and vigorously advocating the measure.

The Directory of the Scientific Societies of Washington (8th publication) shows a total membership of 1,851 for seven societies; an increase of 1,046 in eight years. These figures represent resident, active and life members only, honorary and non-resident members aggregating 455 more.

A bill before Congress proposes to annex a portion of Arizona to the State of Utah; that is to say, that portion of Arizona lying north of the middle of the channel of the Colorado River and west of the eastern boundary of Utah.

H.

RECORD OF GEOGRAPHICAL PROGRESS.

AMERICA.

LABRADOR.—It is expected that quite a large party of college students and naturalists will sail from New York City about June 16 for St. John's, N. F., whence they will embark upon another vessel for the northern Labrador coast, the purpose being to spend six weeks or so studying the zoölogy, geology, botany, archæology and anthropology of that region. It is one of the college excursions to interesting fields of study that, of late years, have been so successful. The expedition is organizing at the University of Pennsylvania, but a number of other institutions will take part in it. The field work will be directed by a number of specialists in these branches of science, and the purpose is to collect material and make as thorough a study as the limited time permits of the northern part of the Labrador coast. The party will be divided into four or five sections, each in charge of one or more professors, and the vessel will leave the sections at the mouths of inlets or rivers, up which they will travel, studying the plant and animal life. These inland trips will be made in boats and with adequate camp outfit. Dr. Frank Russell, archæologist, and curator of the University of Iowa, will give special attention to the study of the Labrador Eskimos, who have many curious traditions, legends and customs, and he hopes to make collections of their folk-lore and handiwork. In order to increase the fund for this enterprise, accommodations for a few laymen will be provided. The professors will give lectures daily on their various subjects, illustrated by the specimens procured, and thus the excursion will be made a valuable training school for young naturalists. The party will return to New York about Sept. 12. Mr. C. E. Hite, of Philadelphia, who has supplied this information, writes to us that the expedition of 1894 (*vide* Bulletin A. G. S., Vol. XXVII., No. 1, p. 63), of which he was a member, found the country full of life and presenting many unique features of much interest to naturalists. He adds: "So far as known, the species of animals and plants number: Invertebrate marine life, 337; insects and spiders, 113; fishes, 23, notably trout, salmon and cod in abundance; batrachia, 3; birds, 209, notably ducks, ptarmigan and other game birds; mammalia, 44, among which are herds of cariboo and reindeer, black bear and five species of seal, easily obtained and affording rare sport. The plants

number 296 species, and the number will be much increased by further research. These shores have been visited by not more than half a dozen naturalists, and at long intervals apart. No systematic study has yet been made of the peninsula, geographically or otherwise, and so the field is comparatively virgin." Dr. A. S. Packard, in his book "*The Labrador Coast*," 1891, says that the Moravian missionaries have given us a much better idea of the intricacies of the extreme northern coast than the charts of the British Admiralty or the United States Coast and Geodetic Survey.

DISCOVERY IN CANADA.—The most recent Canadian explorations of importance are in the region south of Hudson Bay, which Dr. G. M. Dawson designated, in 1890, as "the unexplored region in Canada lying nearest to large centres of population." Between Hudson Bay and the water-parting between its drainage system and that of the St. Lawrence, is an area of 50,000 square miles (as large as New York State) which, up to two years ago, was very little known. In the eastern half of this region Dr. R. Bell, of the Canadian Geological Survey, visited, last summer, a river basin of considerable extent, whose timber and mineral resources give it prospective value. Current reports of the importance of this river system are undoubtedly exaggerated, and the official information is not yet at hand. Mr. Henry O'Sullivan, Inspector of Surveys for the Province of Quebec, made an important journey in the latter part of 1894 in the district just north of the headwaters of the Ottawa River, and west of Dr. Bell's field of labor on the west. An account of this journey appears in the "*Report of the Commissioner of Crown Lands for the Province of Quebec*," for the year ending June 30, 1895. He found the height of land separating the Ottawa basin from the Mekiskan basin, on the Hudson Bay slope, only three miles north of the northern end of Grand Lac Victoria, whose position he had determined in 1893 as $47^{\circ} 48' 25''$ N. Lat., $77^{\circ} 20' 05''$ W. Long. This point was 960 feet above the sea; the height of land is only 40 feet higher, and a portage only 600 feet in length separates the waters of the two basins. North of the water-parting he at once observed a striking difference in the character of the soil and timber. Lake Waswanipi, in $49^{\circ} 40'$ N. Lat. was the northern limit of his journey. The country he crossed, sloping very gently towards Hudson Bay, he describes as fertile land, well adapted for agriculture, with an abundance of merchantable timber, principally tamarack, which, on account of its enduring qualities in contact with the soil, is highly prized for fence posts

and railway ties. In the Upper Ottawa valley the prevailing surface rocks are gneiss and granite, with a sandy soil, while north of the water-parting sedimentary rocks are the characteristic geological formations, and the soil, particularly in the lower levels, is fertile, but in the higher tracts there is considerable rough and scrubby country of little promise. Mr. O'Sullivan describes Lake Waswanipi as a fine sheet of water, 680 feet above sea level, "surrounded by a splendid looking country, level or gently rising in easy slopes, of the richest soil all around, timbered with large spruce, fir, tamarack, bouleau, poplar, etc." The most northern part of this lake is a little south of the latitude of Winnipeg, and Mr. O'Sullivan believes that the climate of the country he traversed compares favorably with that of Manitoba. At Lake Waswanipi, on September 20, he saw potato tops as green as in midsummer. He thinks several thousand square miles are well adapted for agriculture, and throughout his journey he found abundance of water, rivers and lakes, and numerous cascades that would supply motive power. He adds that it would be comparatively easy to build a railroad from any part of the province of Quebec into the heart of this region.

BIFURCATIONS IN SOUTH AMERICAN RIVERS.—Mr. Georg Hübner, who has been travelling for two years in the basins of the Orinoco and the Amazon, reports that the Casiquiare River which unites these two great river basins by a natural water channel is, by no means, the only instance of important river bifurcations in that region. The *Geographische Zeitschrift* (February, 1896) says that Mr. Hübner has found in Venezuela, and particularly in the territory of the Casiquiare, a number of these unions between rivers, and he believes that they will have an important influence upon trade in the future, as they will greatly facilitate communication by water. He adds that a gradually increasing portion of the waters of the Orinoco is reaching the Rio Negro and the Amazon through the Casiquiare, on account of the widening of the gap on the left bank of the Orinoco, which forms the connection between the two rivers. When M. Chaffanjon examined the bifurcation of the Casiquiare in 1888 he said that the place of junction of the two rivers was about 150 feet wide. He accounted for the bifurcation, which he thought had not existed for a long period of time, in this way: A short distance above the Casiquiare the Orinoco flows through a gorge only ninety yards wide. This contraction of the river bed greatly accelerates the current and just below the gorge the rapid stream gradually undermined the left

bank, cutting a channel toward the head-waters of the Casiquiare, of the Amazon system. The water parting there is quite near the Orinoco. Finally, in some period of flood, a little of the Orinoco's overflow reached the Casiquiare, and the excavation of a channel was thus begun, the channel being deepened in subsequent rainy seasons, until the union between the two rivers was complete.

PHYSIOGRAPHIC MATERIALS.—At the third annual exhibit of the New York Academy of Sciences, on March 26, there was, for the first time, a showing of physiographic materials. The exhibit was a small one, and was under the charge of Richard E. Dodge, of the Teachers' College. It included a collection of recent text and scientific books and a set of maps and models illustrating certain chosen topics from the principles of physiography. The aim was to show the best sources to obtain the details of the science as well as the material that could be readily used to illustrate the principles, both to children and to those of more mature years.

The models exhibited were of two classes. One series was to illustrate a theoretical cycle of land development upon constructional forms of various origins. In this case no one place was taken as a type locality. A definite set of conditions was assumed and the changes in form consequent upon the conditions were illustrated. Each land type was shown in its youthful, mature and senile condition. The second set of models was of actual localities in this country, modelled with a small vertical exaggeration, and illustrated particular cases in which examples of rivers, drainage, form, etc., could be found that corresponded with the theoretical cases shown in the first class.

The first set of models was loaned by the maker, Prof. W. M. Davis, of Harvard, who uses them in his teaching. The second set was also loaned by the maker, Mr. E. E. Howell, of Washington, D. C.

The remainder of the exhibit consisted of selected maps showing the relation of topographic form and geologic structure, to illustrate means of representation of form and the importance of a knowledge of physiography in studying the features and conditions of a land. New Jersey was the special base best illustrated. The other maps shown were to illustrate types of shore lines from along the Atlantic and Gulf coast. These maps were the sailing charts of the Coast Survey, and gave examples of the various practical uses that could be made of these maps by the student of land forms and their development.

It was not intended to show all that had been done in the last year in this branch of science, which is advancing so rapidly. It was rather intended to offer suggestive materials that would serve to illustrate, in a striking way, the range of possible studies in the science and the paths along which investigation and application of principles are advancing.

Inasmuch as a proper understanding of physiographic principles and processes is the best basis for the study of political geography and history, it was intended to show in this small way some of the lines of dependence of man, in his development, upon the physiographic features. Another year it is hoped to make the exhibit more inclusive and to show the direct application of principles to other branches of learning.

EUROPE.

EROSION ON THE COASTS OF ENGLAND.—The sea continues to make disastrous inroads along the Eastern and Southern coasts of England, and particularly along the chalk cliffs of Kent, where the English Channel narrows. Correspondents of the *London Standard* take the extremely gloomy view that unless something is done to stop the waste, the entire County of Kent and large parts of the South and East coasts will disappear entirely from the map of England. The sea, driven by tides and winds, dashes against the lower part of the cliffs, softens the porous rock, and digs into it deeper and deeper until the mass above, deprived of its support, breaks off, falls over on the narrow beach, and is washed away by the currents. Engineers seem to have little faith in sea-walls or embankments for protection, they being regarded as only temporary, no matter how costly they are. The efficacy of a wide beach of shingle or sand is affirmed, and the correspondents protest against the practice of removing shingle, stones and even large boulders, which are taken away in boats or schooners and sold, thus robbing the shore of a source of natural protection.

ASIA.

DISTRIBUTION OF ARMENIANS IN ASIATIC TURKEY AND TRANS-CAUCASIA.—*Petermanns Mitteilungen* for January, 1896, contains an article on the distribution and number of Armenians in the larger part of their native home, comprised in Asiatic Turkey and Transcaucasia (Russian), illustrated by a map compiled by Dr. Supan. The facts given show that the Armenians form a far smaller ele-

ment in the population of the recently disturbed districts than has been generally supposed. Nearly two-thirds of the Armenians living in Asiatic Turkey are found in Armenia and Kurdistan, and in the five Vilayets comprising these territories the percentage of the total population which they contribute is: Erzerum, 20.2 per cent.; Van, 18.6; Diarbekir, 16.8; Bitlis, 33; Mamuret-el-Aziz, 12.1. The total Armenian population of these five Vilayets is 478,701, which is not quite one-fourth of the total population, the Mohammedans being nearly three times as numerous, while Jews, Greeks and other Christians contribute a small element. The statistics deal also with the Vilayets of Sivas, Trebizond, Adana and Angora in Asia Minor and Aleppo in Syria, and including them in the general calculation, it appears that in the ten Vilayets of Asiatic Turkey where the Armenians are in any considerable numbers they form only about one-sixth of the population, the Mohammedans being twenty-five times as numerous, while the Nestorians and other Christians are about one-tenth of the population. In Transcaucasia, however, the Armenians who live there in peace and security, while their kindred south and southwest of them are now plunged in the deepest misery, form 36.3 per cent. of the population.

MR. MUMMERY'S DEATH IN THE HIMALAYAS.—Mr. A. F. Mummery, famous as an Alpine climber, lost his life in August last in the Himalayas while attempting to reach the summit of Nanga Parbat (26,630 feet), whose northern flank is washed by the Indus about ten miles away from the central mountain mass. His two Gurkha companions perished with him. He had reached a height of about 20,000 feet on the south side of the mountain. The climbing was most severe, and the last 5,000 feet required two days and a night. Then the Gurkha with him was taken ill and he was compelled to retreat to his camp, 11,000 feet below. Later he tried the northern side of the mountain, he and two Gurkhas ascending a long glacier pass that seemed to offer a promising route. He was last seen on August 24 going up a side glacier tributary to the main ice stream on which he had started. The subsequent search made it evident that all three had been buried under a snow avalanche. The pass where they disappeared from view was a narrow valley walled in by steep slopes covered with snow and ice. As Mr. W. M. Conway showed, in the story of his climbing in the Himalayas, avalanches are the greatest danger that explorers meet among these mountains.

SOURCES OF THE IRAWADI.—Prince Henry of Orleans, one of the new Gold Medallists of the Paris Geographical Society, completed at Sadiya on the Brahmaputra River, on last Christmas, probably the most noteworthy journey of exploration in 1895. He started from Ha-noi, capital of Tonkin, on January 26, last year, accompanied by Lieutenant Roux, M. Breffaut, a Tonkin colonist, and twenty-seven baggage animals, his purpose being first to attain Tali-fu in Yunnan, avoiding main routes and the paths of explorers and giving particular attention to the upper Mekong River in its course through Western China. He found the basin of the Mekong in China, above $24^{\circ} 40'$ N. lat., to be so narrow that it may be crossed in a few hours. From Tali-fu he took the shortest route to India, across a mountainous country that is not practicable for trade. It led him through the region of the Upper Mekong, Salwin and Irawadi rivers, in about 28° N. lat., hitherto supposed to be inaccessible on account of hostile natives, though the Prince, with his two white comrades and his baggage-men, had no trouble. This good fortune enabled him, he says, to finally settle the long-vexed question of the source of the Irawadi. An extract from his letter to the Paris Geographical Society, printed in the London *Times* on February 7, says: "The three branches forming the Irawadi, are, reckoning from the west, the Kiu-Kiang, the Telo and the Namkiu. The first two are the deepest and widest. They are not marked on the maps. The most northerly branch, the Kiu-Kiang, does not rise higher north than $28^{\circ} 30'$ N. lat." He crossed all three branches. He also affirms the inaccuracy of the late Gen. J. T. Walker's map of South Eastern Tibet (Proceedings of the Royal Geographical Society, June, 1887,) and of his map of Tibet, published by the Royal Geographical Society in 1894, in which the Salwin River is indicated as rising near Tchamonlong, south of 28° N. lat. The Prince says he has evidence that the Ur Chu (also Nag Chu or Lu), rising far north and west near Tengri Nor in inner Tibet is the upper course of the Salwin. Only a small part of the course of the Ur Chu has yet been surveyed, but it has, for some years, been indicated in a number of the best atlases as the probable upper course of the Salwin. The mountains among which the Mekong and the Irawadi rise and through which the Salwin and the Brahmaputra flow have long kept the secret of more hydrographic problems than were found in any other small part of the earth. The barbarous Mishmi and other tribes barred the way to explorers Wilcox (1826), Griffith (1836), Abbé Krick (1851-53), and the travels of Pandit Krishna, Macgregor, Needham and others gave food

for geographical controversy if they did not settle vexed questions. It is now known that the Sangpo of Tibet is the upper course of the Brahmaputra and not of the Irawadi, as Mr. Robert Gordon, supported by old Chinese geographers, ingeniously contended (*Proceedings of the Royal Geographical Society*, May, 1885), and that the Ur Chu or Lu of Tibet is the Salwin and not the Irawadi.

NEW ATTEMPTS TO REACH LHASA.—*Petermanns Mitteilungen*, No. 8, 1895, says that Dr. P. Moewis has assumed the habit of a Lama at Darjiling and has professed his conversion to Buddhism as preliminary to an advance upon Lhasa, which he hopes by this means to reach. Mr. and Mrs. St. George Littledale have returned to England after spending a year in a vain attempt to reach Lhasa. They penetrated to within forty or fifty miles of the holy city. Starting from Constantinople in November, 1894, they reached Samarkand by the Trans-Caspian Railway and then followed the usual caravan route to Osh, Kashgar and Khotan, buying transport animals by the way. When they set out from Khotan they had 250 transport beasts to carry their food and fodder and the large collections they had already made. A large number of their horses died for lack of food while crossing the desert to Cherchend and Tibet, and the party, numbering thirteen in all, were compelled to abandon their zoölogical collections, books, instruments and, in fact, everything that was not necessary for life. After reaching Tibet the greatest pains were taken to escape observation, the intention being, if possible, to get to Lhasa without being seen by the people. They made long detours to avoid shepherds or nomads whom they saw in the distance, and often they marched at night and camped during the day. Mr. Littledale says, in an interview published in the London *Times*:

"In spite of the hardships we had to endure, all went well until the beginning of July, when we were within 200 miles of Lhasa. Suddenly we rode into a Tibetan encampment in a narrow pass. We saw the Tibetan shepherds and their flocks in the valley long before we came upon them; but, as a detour was impossible, there was nothing for it but to go through them. Presently two officials came out and told us to stop, which we refused to do, and rode through the encampment as hard as possible. We were not attacked, but we knew that messengers had been despatched to warn the people of our approach, so we rode as hard as we could in order to keep ahead of them. After a week's hard riding we reached Tengri Nor, and here 200 horsemen, armed with spears and matchlocks, were assembled. One man came up and seized my bridle, but, on my pulling out my revolver, he let go. Shortly after this the force disappeared, and presently occupied both sides of a narrow valley through which we had to pass. The situation was threatening, but we had no fighting. With loaded weapons we rode through the Tibetans, pushed on over a very

high pass and finally got to within forty or fifty miles of Lhasa. There we were met by an army of 500 men and some Lamas, who told us to go back. We refused, and stayed for a month arguing with the people. Almost every day the Dalai Lama—the spiritual ruler of Tibet—sent us a message telling us to go back. At this time Mrs. Littledale fell very ill, and we had to make terms for retiring. The people wanted us to go back the way we came, but this was, of course, out of the question. We told them that we would fight our way through in the direction of Sikkim. Seeing we were in earnest, the Tibetans finally allowed us to go via Ladak, which place we reached in November last."

AFRICA.

THE LAKE REGION NEAR TIMBUKTU.—Since the French forces took possession of Timbuktu several members of the military staff have added some interesting facts to our knowledge of the surrounding region. A map published in the *Comptes Rendus* of the Paris Geographical Society (1894, Nos. 18, 19), compiled by Lieutenant Bluzet, gave the first definite information about the lacustrine region that had been discovered west of the Niger and south-west of Timbuktu. The same publication (1895, p. 62), added some details regarding the vast unexplored region in the desert, north and north-east of Timbuktu and east of Dr. Lenz's route. He found no water between Arauan in the desert, and Timbuktu, but a little east there are wells at In Alahi and Bu Jebiba. The latter is a clay-built town and this route is preferable to that followed by Lenz. A summary of the results of the French researches in the region around Timbuktu is presented in the *Bulletin* of the same society, (1895, part 3) by Lieutenant Bluzet, illustrated by a map on a scale of 1:500,000 (approximately thirty-two statute miles to an inch). The paper and map give some idea of this new-found lake region, still partly unexplored, which lies south and east of Lenz's route. Debo, the most southern of these lakes, into which the Niger pours in two channels, is described as a fine deep lake whose blue waters wash a clean sandy beach on the east. North of this lake the whole country on both sides of the river is inundated for half the year and when the waters subside they leave behind, in depressions of considerable depth, a series of lakes connected with the river by channels nearly choked with vegetation. The basins of these lakes, which extend north to the desert, are separated by water-partings of a mean elevation of about 330 feet. Ten of these lakes are known to exist, but they have not all been visited and there may be others. The largest and most northern of them is Faguibine, which is sixty-eight miles long and attains a depth of more than 100 feet. Mountains bound it on the north and east.

Storms are frequent and violent and numerous islands in the lake are very convenient places of refuge when the waves threaten to engulf small craft. Lake Tele is connected with Faguibine on the south by a narrow channel and the Gundam Channel connects Tele with the Niger, flowing to the river in the dry season and from it in the period of inundation; "we must admire," says Lieutenant Bluzet, "the discretion and skill of the guides who escorted Dr. Lenz within a few hundred metres of the lake [Faguibine] without letting him see it; and neither Barth nor anyone else heard of it."

THE POLAR REGIONS.

DR. NANSEN AND THE NORTH POLE.—The fullest statement with regard to the origin of the report from Siberia, in February last, to the effect that Dr. Nansen had discovered the North Pole and was on his way home, was telegraphed from Irkutsk to St. Petersburg, on March 3, by the governor of Irkutsk, who reported that he had received the following from Yakutsk on the lower Lena River:

"Peter Ivanovitch Kuchnareff, who trades at Ustyansk [near the Arctic coast, and the trading point on the mainland which is nearest to the New Siberian Islands] by a letter dated November 10, communicated the following to the merchant Kuchnareff at Yakutsk:—'We learn that Dr. Nansen's expedition has reached the North Pole, has discovered a hitherto unknown land, and has now returned. Consequently the Arctic Ocean has now been explored.' No confirmation of the above has been received from other sources. In order to verify the news and, in case of necessity, to render assistance to the expedition, the governor of Yakutsk has instructed a member of the administration in the Verkhoyansk District to proceed to Ustyansk."

No report has come that Nansen or any of his men had been seen, and while there was some tendency in Europe to give credence to the earliest version of this story, the fact that no confirmation has since been received, and that the story was discredited by the leading Russian authorities, including the Governor-General of Eastern Siberia and the Secretary of the Russian Geographical Society, have practically destroyed all faith in its possible accuracy. From the first all American geographers were entirely skeptical.

THE SO-CALLED JEANNETTE RELICS.—In a letter to the *New York Sun*, printed on February 22, Dr. W. H. Dall gives reasons for believing that the loose papers, biscuit boxes, oil-skin trousers and other articles picked up on an ice floe near to the coast of south-

west Greenland in the summer of 1884, were not, as had been affirmed, relics of the Jeannette party which had drifted across the Polar area from north of the New Siberian Islands, but had been set afloat by the crew of one of the Greely relief vessels of that year, in the belief that another ship of the fleet might pick them up and be mystified by the find. The fact that Dr. Dall and other American authorities believe they have ample evidence to wholly discredit the so-called relics should be recorded, inasmuch as geographical periodicals generally have accepted them, for years, as genuine, and are still republishing the story in connection with the rumors about Dr. Nansen. Dr. Dall says that he stated the facts in letters to Dr. Rink and Baron Nordenskiöld and he adds:

"Shortly before Dr. Nansen's expedition started, some friend of his, whose name has escaped me, wrote to me on Nansen's behalf in regard to these relics, and the facts as I understood them, were furnished, so that, before he sailed, though after he had written of the relics as genuine, Nansen was informed of their doubtful or fraudulent character, at least if my letter to his friend was passed on to him. No doubt of the perfect good faith of the Danes or of Nansen can be held for a moment, but that the latter may have retained his faith in the Arctic currents of which he (as I believe mistakenly) wrote, is altogether probable."

Prof. George Davidson, President of the Geographical Society of the Pacific, writes that the Society has appointed Sir Henry Lund and himself a Committee to report upon the Jeannette relics. Sir Henry represented the Society at Copenhagen two or three years ago and there learned by personal conference the story of the relics. There was then no doubt of their genuineness and the Society means to urge the investigation.

EKROLL'S WINTER IN SPITZBERGEN.—Some years ago, Martin Ekroll announced his desire, as soon as he could secure funds for the purpose, to use some point in Spitzbergen as a base for a sledge journey over the ice-covered sea, to the North Pole. He spent the winter of 1894-95 in Spitzbergen for the particular purpose of studying the ice conditions, and he has returned to Norway convinced that the chances of reaching the Pole by sledge from Spitzbergen are exceedingly remote. In the summer of 1894, the waters along the eastern shores of the archipelago, usually choked with ice, were quite open, so that Ekroll's vessel was able to reach the east coast of North East Land, where he wintered, the vessel being frozen in the ice from October 17, 1894, to July of last year.

Many bears were seen and sixty-three were killed. Mr. Ekroll believes that the formation of glaciers, especially in East Spitzbergen, is on the decline.

MR. ANDREE'S COMING BALLOON EXPEDITION.—Mr. Andree, who will attempt to cross the North Polar area in a balloon, expects to complete the airship in April, to start, early in May, for the northwest coast of Spitzbergen, and to be all ready there, if a favorable wind occurs, to begin his venturesome journey by May 25. The cloth of which his balloon is making is said to combine lightness with a greater degree of strength of texture than has been attained in balloon-making, heretofore, and the seams are still stronger than the cloth. A balloon house is building in Norway to be taken in sections to Spitzbergen and there erected. This octagonal house will be about 80 feet high and 110 feet broad. It will be covered by a roof of balloon cloth, and in this structure, the balloon will be inflated and confined until the ascent is made. The floor and inside walls of the house will be covered with felt to prevent damage to the balloon by friction. Thirty-five tons of sulphuric acid and malleable iron shavings will be taken to Spitzbergen for the manufacture of the inflating gas. Letters have been despatched to all the Hudson Bay posts in Northern Canada, to spread intelligence of the enterprise among the Indians and Eskimos so that they may not regard the balloon as a dangerous apparition, but may be disposed to give the explorer assistance if necessary. The same information is being spread over Northern Siberia. Mr. Andree succeeded in arousing so much interest in his project in Scandinavia that ample funds were provided for his needs. While Arctic authorities by no means approve of his scheme, they will await its outcome with much interest. Mr. Andree is a very accomplished aeronaut and he deserves success, even though so perilous a mission cannot be encouraged as a practical method of extending geographical knowledge. At all events he has won respect by his careful and cautious preparations, availing himself, as he has done, of every aid that science affords. He has a record of nearly every cache of provisions that has been left in Arctic regions which may, possibly, be of use to him if he is stranded in those parts. His balloon will carry two or three persons, a sledge, sailing boat, several guns, a camera, ballast and provisions for four months. Mr. Andree believes it will be sufficiently gas tight to hover in the air for thirty days at a height of about 800 feet. At starting he desires a south or nearly south

wind in order to get into the central Polar basin over a considerable part of which, if he has good fortune, he may drift, driven by variable winds. Dr. Ekholm the well-known meteorologist, who had charge of the Swedish station in Spitzbergen in 1882-83, will accompany him.

The Geographical Society of the Pacific, in compliance with a request made by the Minister of Sweden and Norway at Washington, early in March appointed President Davidson and Sir Henry Lund, the Swedish Consul at San Francisco, a Committee to take measures for spreading through Alaska and the coasts and islands of the Arctic the information which shall prepare the inhabitants to receive and to aid the explorer Andree, in the event of his descending among them during the summer from his daring balloon voyage to the Pole. A number of notices for distribution among the natives of Northern Alaska, British Columbia and Siberia, were sent by the steam whaler *Orca*, which left San Francisco for the Arctic on the 17th of March.

The Alaska Commercial Company, the Pacific Steam Whaling Company and other organizations have responded favorably to the appeal made in the following letter:

GEOGRAPHICAL SOCIETY OF THE PACIFIC.

SAN FRANCISCO, March 16, 1896.

Captain Josiah N. Knowles, President of the Pacific Steam Whaling Company—
Dear Sir: The Geographical Society of the Pacific has been officially informed that Professor Andree will complete the outfit of his balloon expedition to the North Pole so as to start from Spitzbergen in the month of July. This attempt to reach the North Pole is favorably supported by the Swedish Government and by scientific men in Europe who have investigated his appliances and methods.

Of course no one can predict where this balloon may come down in the circumpolar regions, and the Swedish Government is desirous that information shall be sent to that region whenever it is practicable by all such parties as are in or going to the North. Therefore the Geographical Society of the Pacific proposes to exert its influence in urging all parties from California, Oregon, Washington and British Columbia to make known to the inhabitants of those parts of Alaska, British Columbia and Siberia bordering upon the Arctic Ocean, the possibility of the balloon reaching their country and asking them to give the balloonists support and assistance and help and direct them to the nearest white settlements, and if the balloon should be seen from any place, that the natives will report the same to the nearest white settlement.

The Geographical Society of the Pacific therefore urges the Pacific Steam Whaling Company to instruct their captains to circulate this information about the balloon to all natives and persons within their reach in the Arctic regions.

By order of the Council,

GEORGE DAVIDSON,
HENRY LUND,

Committee.

THE GERMAN SOUTH POLAR EXPEDITION.—The German Commission for South Polar Exploration issued a memorial in December, outlining its scheme for a German Expedition. The Commission advises that the proposed expedition shall enter the Antarctic regions from the Indian Ocean along the meridian of Kerguelen Island, which is between the widely separated routes of Cook (1773) and Nares (1874), offering a wholly untried route into the unknown area and which, on that account, may result in interesting discoveries. To carry out the desired investigations in meteorology, terrestrial magnetism, geodesy and other branches of science, it is important to spend a Winter upon an island or upon the coast of the supposed Antarctic continent. It is desirable that two vessels shall be at the disposition of the party, one to remain at the headquarters of the expedition for whatever service the explorers there may require, while the other ship engages in geographical and hydrographical investigations. These vessels should be specially built for Polar navigation, and of about 400 tons burden (nearly three times the tonnage of the *Germania* of the German North Polar Expedition of 1869-70). Each ship should carry thirty men, including on each vessel four officers and four scientific specialists, from among whom the observers at the station should be selected. The total cost of the expedition is provisionally estimated at \$225,000, a considerable part of which has already been pledged by private citizens who are interested in Antarctic exploration. Subscriptions towards completing the fund are invited. The financial participation by the government in the enterprise will depend upon the interest shown by the amount of public subscriptions. The President of the German Commission is Professor Dr. Neumayer of Hamburg, the well-known meteorologist and, for years past, one of the foremost advocates of the great importance to science of the renewal of Antarctic research.

NO AMERICAN ANTARCTIC EXPEDITION YET.—The report has been widely printed in Europe and copied into some American journals that an expedition consisting of two vessels, left this country last fall, to engage in exploration in the South Polar area. The report is entirely incorrect, as no American expedition has sailed for Antarctic waters; nor are we aware that there is any immediate prospect of the launching of such an enterprise here.

THE OCEANS.

THE DEEPEST SOUNDINGS YET MADE.—It was announced in the *Bulletin* (No. 4, 1895), that Commander A. F. Balfour on H. M. S.

Penguin had discovered a deeper spot in the ocean than any yet known. His observation, however, was not complete, as his wire broke when he had run out 4,900 fathoms without having reached bottom. This was in the Pacific Ocean, in $23^{\circ} 40'$ S. Lat., $175^{\circ} 10'$ W. Long., over 200 miles south of the Island of Tongatabu, the largest island of the Tonga or Friendly group, and in the neighborhood of the usual steamship route between San Francisco and Australia. Later, he resumed his sounding with much success, as is described in *Nature* of February 27, obtaining three casts that are deeper than any previously made. Returning from Tongatabu to the spot where he had failed to reach bottom with 4,900 fathoms of wire, he found it at 4,940 fathoms, and a little northeast of this spot he reached bottom at 5,022 fathoms. A little further east he found the bottom shallowing; and obtained a sounding at 3,100 fathoms. Then turning southwest over a bank where his wire measured depths between 2,200 and 4,400 fathoms, he struck another great depression of 5,147 fathoms, about 100 miles E. N. E. of Sunday Island, in the Kermadec group, and 100 miles east of MacCarthy Island he secured the deepest sounding yet made, 5,155 fathoms, which is 600 fathoms or 3,000 feet deeper than the sounding by the U. S. S. *Tuscarora* near Japan in 1874. It is interesting to observe that these three soundings of over 5,000 fathoms were not obtained in the same hollow, but are separated by areas of much less depth. The two extreme soundings were 450 miles apart. On two occasions the usual abysmal red clay was brought up by the sounding tube and a microscopic examination of the specimen from 5,147 fathoms shows that the remains of siliceous organisms are almost, if not entirely absent. The discovery of these greatest known ocean depths near the sub-marine plateaus on which rest the island groups of Tonga and Kermadec, gives further confirmation of the fact already observed, that "as a rule, the deepest water is found not in the central parts of the great oceans, but near or approximately near the land, whether of continental mass or island isolation."

A REMARKABLE VOLCANIC ISLAND.—The *Geographical Journal* for January, 1896, prints an account by Lieut. Boyle T. Somerville, H. M. S. *Penguin*, of a visit to the small island of Niuafoú, which is quite isolated in the Pacific, about midway between the Fiji and Samoa groups. This island is the upper portion of a volcano reared from the sea floor by the accumulation of ejecta, and the remarkable feature about it is that an eruption blew out the interior, leav-

ing merely a ring around a central cavity. This ring, which is about $3\frac{1}{2}$ by 3 miles in diameter, has an average height of 350 feet above the sea, and is covered with vegetation, except in one place, where a recent lava stream has not yet received its coating of green. The ring is nowhere more than a mile in width, and parts of it are much narrower. The whole of the interior area, about 3 square miles, is occupied by a picturesque, nearly circular lake, roughly 2 miles in diameter, containing three green islands. Round its circumference drops a sheer precipice, 200 to 300 feet in depth, whose sides are covered with the luxuriant foliage and huge creepers of the tropics, from which, here and there, buttresses of rock jut out that, ages ago, must have overlooked the huge crater basin of fire beneath, now covered by the peaceful lake. Lieut. Somerville and his party descended to the lake whose surface was found, by aneroid, to be 95 feet above the sea level. The water is slightly alkaline, but the horses on the island drink it. The lake is called "Vai Lahi" (Great Water), contains no fish and is said to be very deep, though the tradition of a sounding of 100 fathoms with no bottom requires confirmation. Moti Moli Moli, the second in size of the three islands, is said to have a small crater of its own containing fresh water, a lake within a lake. An oddly shaped peninsula with a bare, reddish surface jutting into the lake from its east side, was lifted above the water in 1886, by an eruption, and clouds of dust and sand were being driven by the wind into the lake. This mass was upheaved from the lake bottom. The natives have begun to plant cocoanuts on the lower parts of it. Besides an abundance of wild ducks, there is another bird which is said to be found alone on Niuafoú. It is called "Malau," and apparently belongs to the family of Megapodes (birds with large feet, of which the jungle bird of Australia is a typical example). It buries its eggs for hatching in the soft, hot sand. It is the size of an ordinary fowl, russet-brown in color, shaped like a guinea fowl, with small head and strong, pink legs and feet. About 1,000 Tongans live in nine villages on the sea edge of this narrow crater rim. They are all Christians. One French priest, two English traders and a German form the white population. The disintegrated lava makes a deep rich soil, and cocoanuts, bananas, taro and other tropical food plants are raised in abundance. Copra is exported. The island is the northern limit of the Tongan dominions, and has a native Tongan governor. The anchorage is poor, but a landing may be made without much difficulty when the tide and wind are favorable.

THE INTERNAL SLAVE-TRADE IN AFRICA.

It is well known that the internal slave-trade is the most potent of the evil influences which oppose the progress of civilisation in Africa.

It was so recognised in the GENERAL ACT BETWEEN THE UNITED STATES OF AMERICA AND THE OTHER POWERS FOR THE REPRESSION OF THE AFRICAN SLAVE-TRADE, AND THE RESTRICTION OF THE IMPORTATION INTO, AND SALE IN, A CERTAIN DEFINED ZONE OF THE AFRICAN CONTINENT, OF FIRE-ARMS, AMMUNITION AND SPIRITUOUS LIQUORS.

This Act was ratified in the United States, January 19, 1892, and took effect on the 2d of April, 1892. It declares that the best means to extinguish the slave-trade and slavery itself are:

- (1) The organization of a civilized administration by Christian nations.
- (2) The establishment of a net-work of fortified stations and centres of civilization.
- (3) The development of lines of communication by roads, especially railroads, by steam navigation on lakes and rivers, and by telegraphic wires.
- (4) The organization of an armed police force, to intercept slave-caravans and ensure the safety of the roads and waterways.
- (5) The exclusion of rum and fire-arms from certain regions.
- (6) The encouragement of scientific exploration, of legitimate commerce, and of Christian missions without distinction of creed.

It provides for the establishment of bureaus in Europe and in Africa to watch over the execution of its clauses, for the granting of letters of freedom by competent authorities, for the repatriation or the settlement and education of liberated slaves.

Recognizing that mere liberation seldom improves the condition of the slave, it calls for the assistance of special societies organized for the purpose of liberating, settling and educating the victims of the slave-trade.

With this Act before him as a text, Mr. Heli Chatelain, who has devoted himself for years most unselfishly to the work of civilisation in Africa, shows in a recent pamphlet what has been done for the extinction of slavery by Germany, England and the Congo State, and by the anti-slavery societies, Catholic as well as Protestant, and how much also remains to be done.

Mr. Chatelain, as an American, now calls on the people of the United States to do their part in this great task of redemption. In his twelve years of unpaid service in the cause he has made himself thoroughly acquainted with the native mind and character, out of which, under instruction and guidance, must come the development of Africa.

The following plan of operation, which he has elaborated, has received the approval of many distinguished men, as inexpensive, simple and practical:

Plan of Work: (1) Obtain from England, Germany, France, Portugal or the Kongo State suitable concessions of land and the promise of liberated slaves—if possible, with a subsidy.

(2) Settle these ex-slaves on alternate lots, with the needful tools, seeds, clothing and food to enable them to raise a first crop.

(3) Teach them by example how to improve native house-building, farming and industries; introduce civilized trades and new cultures of saleable produce.

(4) Induce the settlers to work, by purchasing this saleable produce and giving them in exchange useful articles of trade; encouraging them also in thrift.

(5) Sell them the empty lots as fast as they have earned enough to pay for them, and procure them legal titles to their farms as soon as they realize the importance and responsibilities of proprietorship.

(6) Teach them reading, writing, arithmetic, geography, and give practical instruction in non-sectarian Christian religion, as well as in civilized citizenship.

(7) Submit each colony to a code of rules designed to exclude the main causes of the African's miseries and of the ruler's difficulties, which causes are: (a) Witch-doctoring (practical poisoning), legal ordeals (from which thousands die year after year), and all heathen practices; (b) polygamy, with all its evil concomitants (cause of endless misery); (c) rum and hemp-smoking (two baneful, brutalizing agencies); (d) idleness (largely due to slavery); (e) immoral white men.

Staff of Workers.—(1) A superintendent (if possible a medical man); (2) a farmer and mechanic; (3) a teacher (one or two of these married); (4) native Christians or colored Americans as assistants.

Probable Cost.—Foundation and first year of one settlement for about 200 men and women \$10,000; second year \$2,000; within a few years final self-support.

It is hoped that each settlement will become self-propagating, the income from the sale of empty lots enabling the Society to start another colony.

Any person or company giving \$5,000 would have the naming of a settlement and a voice in its management.

Organisation (special features).—NAME: "Philafrican Liberators' League."

MEMBERSHIP: Every person contributing \$1 annually. LOCAL BRANCHES: to be established in principal cities. OFFICERS: (1) An Executive Committee, composed of prominent men and women, who take a practical interest in the League and are able to meet at stated times; (2) A General Council composed of delegates of Local Branches; (3) An International Council, composed of great names connected with African work; its functions being honorary and advisory; (4) And, of course, the usual staff of presidents, secretaries, trustees, etc.

General Policy.—The Philafrican League will simply take the slaves whom the governments have liberated, and transform them, in cordial understanding with said governments, into hard-working, civilized, law-abiding Christian citizens of the countries in which they reside.

Mr. Chatelain may be addressed at 511, United Charities Building, Fourth Avenue and 22d Street.

BOOK NOTICES.

Elementary Physical Geography. By Ralph S. Tarr, B.S., F.G.S.A., Assistant Professor of Dynamic Geology and Physical Geography at Cornell University, Author of "*Economic Geology of the United States.*" Macmillan & Co., New York and London. 1895. Price \$2.50.

In preparing this book, Mr. Tarr has made an attempt to meet the apparent demand for a new text-book on physical geography without following what he calls the somewhat radical suggestions, which were made by the majority of the Geography Conference of the Committee of Ten,* though he does not neglect the physiographic side of his subject. The sole purpose has been to present facts and furnish information without discussing methods, and the author has little faith in the value of text-book work without the aid of the laboratory and field study.

The three parts into which the book is divided treat, respectively, of the air, the ocean and the land. The earth as a planet, the solar system and the nebular hypothesis find a place in the first division with the atmosphere, its circulation and disturbances, weather and climate and the geographic distribution of animals and plants; a range wide enough to satisfy the most exacting physiographer. Logically, a description of nature may fairly include everything that is, but the nebular hypothesis might, perhaps, be taken for granted in this case.

The orderly presentation of topics and the care taken to insure scientific accuracy are deserving of praise; but it must not be supposed that the book is a repository of dry facts. It is, on the contrary, full of vitality and freshness for the reader as well as for the student, and every one interested in the new physical geography, which has absorbed and transformed the old, will make haste to possess the volume. The style is generally direct and clear, though marred at times by an incorrect word or phrase, such as *proven* and *we now know considerable*.

Mr. Tarr makes great use of illustrations, all well chosen, but not always successfully rendered.

See *Reports of a Conference on Geography*, Journal of Am. Geog. Soc., Vol. XXVII, 1895, pp. 30-41.

Conquest of the Country northwest of the River Ohio, 1778-1783, and Life of Gen. George Rogers Clark. Over one hundred and twenty-five Illustrations. With numerous Sketches of men who served under Clark and full list of those allotted lands in Clark's Grant for service in the Campaigns against the British posts, showing exact land allotted each. By William Hayden English, President Indiana Historical Society. 2 vols. 8vo. Indianapolis, Ind., and Kansas City, Mo., The Bowen-Merrill Company, 1896.

These solid volumes contain a part of the material collected by Mr. English for a contemplated history of Indiana, to which they might have served as an introduction, had death spared the author to work out his plan.

The story of the Conquest is told at great length and with frequent digressions, all interesting in themselves, but out of place in the narrative which they interrupt. The author seems to have been embarrassed by the number of documents in his hands, as well as by the difficulty of keeping in view at the same time the biography of Clark and the events of the Conquest. There is no perspective in the composition and the attention is fatigued with unnecessary details. This is the more to be regretted that Clark was a remarkable man and that a well-written life of him would be a valuable contribution.

In the Appendix to the first volume Mr. English has printed Clark's Letter to George Mason (first published in 1869 by Robert Clarke & Co., Cincinnati) and Clark's Memoir, now first given to the public in full. The Memoir is without date, but Jefferson, in a letter written in 1791, speaks of Clark as then probably engaged in "writing the account of his expeditions north of Ohio."

Other papers are: A List of the Officers and Soldiers of the Illinois Regiment and the Land allotted to each; Sketches of the Men who served under Clark; Account of Clark's Brothers and Sisters; and a List of the Officers and Privates who served in the Campaigns but did not receive allotments of Land in Clark's Grant.

The work is abundantly illustrated with portraits, fac-similes, plans and diagrams, and with some not very happy sketches of historical scenes.

Names and Their Histories. Alphabetically arranged as a Handbook of Historical Geography and Topographical Nomenclature. By Isaac Taylor, M.A., Litt. D., Hon. LL.D., Canon of York. Author of 'Words and Places.' 8vo. New York, Macmillan & Co., 1896.

Canon Taylor says very truly, in the *Prologue* to this book, that

speculation as to the meaning of a name, without reference to its primitive form or to its subsequent history, is always futile, and frequently misleading, but this sound proposition has not always been kept in view. Learned as he is, Canon Taylor makes some rash statements, and in one instance, at least, he betrays a great simplicity of mind. He rightly condemns in his *Prologue* many of the American names, such as Memphis, Utica, Troy, Minneapolis, Indianapolis, and adds:

Worst of all is the procedure adopted in the new State of Washington, where the counties were named by shaking the letters of the Alphabet in a bag, and then emptying them, a few at a time, upon the floor, a process which has yielded such hideous monstrosities as Wankikum, Klickitat and Snohomish (p. 24).

State Legislatures are guilty of many things, but the counties of Washington were named years ago, before the Territory was admitted as a State, and the names Wahkiakum, Klickitat, Snohomish, Kittitas, Kitsap, Skagit and other unlovely combinations are genuine Indian names, racy of the soil. A Psalmanazar might invent them, but not a legislature, and a good mathematician might calculate how many years would be required to produce the single word, Wahkiakum, by the bag-shaking process.

Under *Sierra Leone* is the following explanation:

The word *Sierra* (Portuguese *Serra*) is often supposed to denote a toothed or saw-like range of mountains, but is probably a corruption of the Arabic *sahra*, which we have in the name SAHARA (q. v.).

This name Canon Taylor translates by *deserts* or *wildernesses*, and looks no further for the meaning of *sierra*, which is none the less the Latin word *serra*, and has nothing to do with Arabic. The testimony of Du Cange is decisive on this point:

Thereafter *SERRA* began to be used for mountain or hill: in which sense the Spaniards even now say *Sierras**

The article on Trinidad is pre-eminent for inaccuracy and recklessness:

. . . the look-out at the masthead saw three separate flat summits, which were afterwards found to be united, so as to form one island. Hence Columbus called it *Ilha de la Trinidad*. In like manner a triangular island on the western coast of India was regarded by the Portuguese as a symbol of the Trinity, and hence called *Divo*, now *DIU*.

Columbus says: subió un marinero á la gavia, y vido al Poniente

* Exinde *SERRA*, pro Monte, vel colle usurpari coepit: qua notione Hispani etiamnum *Sierras* dicunt

(*Glossarium Med. et Inf. Latinitatis*, Tom. VI, p. 205. Firmin Didot edition, 1840-1850.)

tres montañas juntas: (*Navarrete, Viages y Descubrimientos, Tom. 1, p. 247.*)

a sailor went up to the main-top, and saw to the west three mountains joined together.

The island was named *Isla de la Trinidad*, because Columbus used the Spanish language. If he had meant to use Portuguese, he would have written *Ilha da Trindade*.

Diu, the "triangular island on the western coast of India," is not triangular, but oblong (six and a quarter miles in length and one in breadth), and it was not regarded by the Portuguese as a symbol of the Trinity. If it had been so regarded and if they had wished to name it in consequence, they could not have called it *Divo*, because that is not a Portuguese word and it does not mean the Trinity. It is an Italian word, signifying *divine*. Canon Taylor is apparently under the impression that *Divo* is the Portuguese name of *God*, but his learning is at fault, and those who follow his guidance will go astray. In the Portuguese language the name of *God* is *Deos*, or, more correctly, *Deus*, as in Latin. The name *Diu* is not of European origin; it is native to India. According to Yule and Burnell (*Glossary of Anglo-Indian words, p. 246*) it is derived from the Sanskrit *dvīpa*—island.

The examples given show Canon Taylor at his worst. Much of his work is well done and will be helpful if used with discrimination; but he is unfamiliar with Spanish and Portuguese, both needed for his task, and his knowledge of Italian is slight. He writes Talavera *della Reyna*, *Don Quadra* (art. *Vancouver*), *Rio das Amazonas* (as Spanish), *Rio Janeiro* (p. 17), *Riviera de Levante* (p. 27), *Piazza di Termini* (art. *Termini*), and the like. He spells the name of a well-known Russian city, *Vladikaukaz*, not regarding the value of the Russian *B*.

Some of these errors may be due to the printer, but for most of them the responsibility lies with the author.

In the following passage, from his Preface, Canon Taylor assumes a position and invites a comparison:

I have also omitted many recent names in the Arctic regions and in Australia, . . . as they will mostly be found in Egli's *Nomina Geographica*, a valuable though not always trustworthy work. Useful as this compilation has proved, I have, in most cases, thought it best to refer directly to the books he quotes, and to which his work serves as a sort of Index (p. v.).

Dr. Egli's work is marked by judgment and sound scholarship, not less than by wide reading and original investigation. It may be called a compilation, in the sense in which Grimm's dictionary

is a compilation; but to say that it is not trustworthy is to use words without knowledge. Dr. Egli is scrupulously faithful in his citations and interpretations, and it may be affirmed that the most patient search through the 1035 pages of the *Nomina Geographica* will fail to bring to light any error, implying ignorance or presumption on the part of the author. Not even Canon Taylor can say as much for the 390 pages of *Names and Their Histories*.

The Hill-Caves of Yucatan. A Search for Evidence of Man's Antiquity in the Caverns of Central America. Being an Account of the Corwith Expedition of the Department of Archaeology and Palæontology of the University of Pennsylvania. By Henry C. Mercer, Curator of the Museum of American and Prehistoric Archaeology at the University of Pennsylvania, in charge of the Expedition. With Seventy-Four Illustrations. 8vo. Philadelphia, J. B. Lippincott Company, 1896.

Mr. Mercer's thoughts had been occupied since the year 1890 with the idea of searching in the caves of Yucatan or Chiapas for the beds of charcoal and ashes associated with human relics and denoting human occupancy, when, at the end of 1894, Mr. J. W. Corwith, of Chicago, made an offer to the University of Pennsylvania to equip an expedition. Even then, with Yucatan in his mind, Mr. Mercer seems to have been undecided which way to turn; whether to Brazil, or to Peru or to Mexico. Prof. Heilprin came to the rescue with a report of large, dry caves in a small range of hills in Central Yucatan. In these there were signs of human habitation and they might be expected to furnish an answer to the question: How long had man lived in Yucatan?

The hills in question are in the western part of the peninsula, southwest and south of Merida, and they are overgrown with forest. The caves open into the ground like wells. They form, says Mr. Mercer,

a very striking class of underground chambers from fifty to three hundred and fifty feet in diameter and from fifteen to seventy feet high, more or less brightly lit by round openings in the ceiling ten, twenty and fifty feet in diameter. Through these skylights fragments of the original crust had fallen, forming piles of loose stones on the cave floor. When the downfallen accumulations set sufficiently against one side of the orifice, it was easy to walk down their slope, but, as a general rule, a chasm of some feet had to be bridged over in reaching them, either by descending on a rope or clambering down the root of the alamo-tree, which flourished on the brink of most of the skylights, often sending its tendrils to the cave floor. Where the rock pile was high enough, banana-trees and tropical evergreens growing upon it swept the brink of the chasm with their boughs, making strange rattlings when the wind blew. Some-

times the subterranean groves lay far beneath the surface in rotundas inaccessible from above. Then they were first seen after a long clamber underground, like gardens beneath the vaultings of sombre passages. Doves built their nests in high ledges by the skylights, and animals found refuge under the rock heaps, where Indians had built blinds of loose stones to stalk them (*p.* 22).

The work of the expedition occupied sixty days and the area examined was about one hundred miles in length by ten in breadth. Twenty-nine caves were visited and ten of these were excavated. Thirteen had archæological significance. Six yielded valuable, and three, Sabaka, Oxkintok and Loltun, decisive results. The layer of human refuse was substantially the same in all the caves, which had not been used as dwellings nor as burial-places, but only as halting-spots.

Human bones in the rubbish indicated that cannibalism had been practised. The explorers found neither copper nor gold nor silver, no jade, no gums, no preserved grains, no cloth, no weaving apparatus, no pipe, no tobacco, and they agreed upon these conclusions:

First. That no earlier inhabitant had preceded the builders of the ruined cities of Yucatan.

Second. That the people revealed in the caves had reached the country in geologically recent times.

Third. That these people, substantially the ancestors of the Maya Indians, had not developed their culture in Yucatan, but had brought it with them from somewhere else.

It is recognized that these conclusions may be upset by future revelations in some cave or caves not visited by this party, but meanwhile they stand as the outcome of a most intelligent and carefully-conducted exploration.

Mr. Mercer did not confine his observations to caves and human rubbish. His remarks on the country and the scenery, the living Mayas and their ways, have more than a passing value.

Some misprints, such as *siebo-trees* and *terra caliente*, several times repeated, should not have been allowed to pass.

The text is elucidated by more than seventy illustrations from photographs and drawings.

Lakes of North America. A Reading Lesson for Students of Geography and Geology. By Israel C. Russell, Professor of Geology, University of Michigan. 8vo. Boston, U. S. A., and London. Published by Ginn & Company, 1895.

In this volume Prof. Russell has brought together the results of his studies and observations during thirteen years' geological work for the National Government, supplemented by information drawn

from the publications of the U. S. Geological Survey and several State surveys.

The history of a lake, he says in his Preface, begins with the origin of its basin, and considers among other subjects the movements of its waters, the changes it produces in the topography of its shores, its relations to climate, its geological functions, its connection with plant and animal life, etc.

There are no natural groups of lake basins, so defined that they may be easily classified, but the mode of origin supplies a good working principle of classification, and this has been adopted by the author. He describes briefly and well the depressions on new land areas, the basins due to atmospheric, aqueous, glacial and volcanic agencies, the basins formed by earthquakes, those resulting from movements in the earth's crust, from land-slides and chemical action. All these types are represented in North America. Among the mountain lakes Prof. Russell is uncertain whether to give the palm to Tahoe, or to the comparatively unknown Lake Chelan in Washington. This is a narrow, river-like sheet of water, extending westward from the Columbia River seventy-five miles into the mountains, and bordered on either hand by a continuous series of rugged peaks, that rise from five to over seven thousand feet above its surface. The valley in which the lake lies, seldom more than four miles wide, is not less than one hundred miles in length. The narrow valley bottom is filled with majestic trees and a lower vegetation of almost tropical density, and from the head of the lake the loftiest summits of the range, usually white with snow, can be seen far up the gorge beyond where boats can go.

The climate of the region is mild, almost throughout the year, and the lake is now accessible by railroad.

In his remarks on the Laurentian lakes, Prof. Russell says:

Lake Superior still retains its position as the largest sheet of fresh water known, although the more recent discovery of Lake Victoria Nyanza has brought a rival into the field. This African lake is estimated to have an area of about 18,000, which is 12,000 square miles less than the great American lake; but when an actual survey shall have been made, it is possible that this difference will be materially decreased (p. 57).

It does not appear who estimated the area of the Victoria Nyanza at 18,000 square miles.

Whoever he may have been, he certainly did not take into account what is actually known of the lake. It extends through nearly three degrees of latitude and quite three degrees of longitude, and its outline, except in the southeast, is fairly regular.

Its area is estimated in *Longman's Gazetteer* (1895) at 32,167

square miles; in Vivien de Saint-Martin's *Nouveau Dictionnaire de Géographie Universelle* (1894), at 83,310 square kilometres=32,167 square miles. It is yet too early to decide whether it is larger or smaller than Lake Superior, but there is every reason to believe that its area greatly exceeds that of Lake Huron.

If Prof. Russell accepts an insufficient estimate for the Victoria Nyanza, he is clearly wrong when he affirms (p. 69) that the maximum depth of the Caspian, 3,000 feet, exceeds that of any other lake known. The Polish savants, Dybowski and Godliefski, who took careful soundings in Lake Baikal in 1876, found a maximum depth of 1,373 metres=4,504 feet.

Good illustrations and diagrams add to the value of this compendious work.

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JANUARY-MARCH, 1896.

BY PURCHASE.

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Circulars, Nos. 123, 124; Studies, Constitutional History of Hawaii, by Henry E. Chambers; City Government of Baltimore, by Thaddeus P. Thomas, Ph.D.; Colonial Origins of New England Senates, by F. L. Riley, A.M.

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Alaska As It Was and Is, 1865-1895, Washington, 1895, pamphlet, 8vo.

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From W. Bell Dawson, Author:

Survey of Tides and Currents in Canada Waters, 1895. Ottawa, 1896, pamphlet, 8vo.

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Mitchell's New Traveller's Guide through the United States and Canada, etc., with Maps. Philadelphia, 1856; G. Woolworth Colton's New Guide Map of the United States and Canada. New York, 1861 (Pocket Map); New Map of the Vicinity of Boston. E. P. Dutton & Co., Boston, 1860. (Pocket Map.)

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Proceedings, Vol. XXVI, 1894-95.

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Vol. 18, 1896, No. 1, Jan.-Feb.

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Nachrichten, Mathematisch-physikalische Klasse, 1895, Heft 4.

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Nova Acta, Band LXIII. Nr. 1, Band LXIV. Nr. 6; Leopoldina.
30 Heft, Jahrgang 1894, 31 Heft, Jahrgang 1895.

From the Geographical Society of Hamburg :

Mittheilungen, Band XI and XII.

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Bulletin, Novembre-Décembre, 1895.

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Archiv, Neue Folge, 27 Band, 1 Heft.

From Ernst von Hesse-Wartegg, Author :

Nord-Amerika, seine Städte und Naturwunder, u. s. w., Leipzig, 1892, 4to; Nord-Amerika, i våra Dagar, Stockholm (1893), 4to; Tausend und ein Tag im Occident, Leipzig, 1891, 2 vols. 8vo; Korea: Eine Sommerreise nach dem Lande der Morgenruhe, Dresden und Leipzig, 1895, 4to; Kanada und Neu-Fundland, Freiburg-im Breisgau, 1888, 8vo; Andalusien, eine Winterreise durch Spanien, u. s. w., Leipzig, 1894, 8vo; Chicago, eine Weltstadt im amerikanischen Westen, Stuttgart, Berlin, Leipzig, 1893, 8vo; Chicago, Världsstaden i den Amerikanska Västern, Stockholm (1893), 8vo; Prairie-Fahrten, Leipzig, 1878, 8vo; Die Einheitszeit nach Stundenzonen, Leipzig, 1892, 8vo; Curiosa aus der neuen Welt, Leipzig, 1893, 8vo; Mexico, Land und Leute, Wien und Olmütz, 1890, 8vo.

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Bulletin 109, Jan. 1896. Agricultural Experiment Station.
Geological History of the Chautauqua Grape Belt, by R. S. Tarr.

From the Geographische Gesellschaft, Jena :

Mitteilungen, Band 14, 1895.

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Library Record, Vol. 4, Nos. 8, 9, 11.

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Leçons de Géographie Physique, Paris, 1896, 8vo.

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Bulletin, Tome 24, 1895, Nos. 1, 12; Tome 25, 1896, No. 1.

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The Hill-Caves of Yucatan, by Henry C. Mercer, Philadelphia, 1896, 8vo.

From the Sociedade de Geographia, Lisbon :

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The Fourth Annual Report of the Council for Year ending December 31st, 1895.

From the Royal Geographical Society, London :

The Geographical Journal, Vol. VII, Nos. 1, 2, 3, Jan., Feb., Mar., 1896; Notes of a Journey on the Upper Mekong, Siam, by H. Warrington Smyth, London, 1895, 8vo; Topography of the Battle of Plataea, by G. B. Grundy, London, 1894, 8vo.

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Proceedings, Vol. 59, Nos. 353, 354.

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Journal, Vol. 58, Part 4, Dec., 1895.

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The English Lakes. With Bathymetrical Maps and Illustrations, London, 1895, pamphlet, 8vo.

From Prof. John Milne, F. R. S., etc. Shide Hill House, Shide, Newport, Isle of Wight, England :

The Seismological Journal of Japan, Vol. I, 1893; Vol. IV, 1895.

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Geography (bulletin), Part 4, 1895.

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Bulletins, Jan., Feb. and March, 1896.

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Journal, Vol. III, No. 3, Dec., 1895.

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Catalogue, 1895-96.

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Annual Report for 1894, with Map, Valley of the Passaic, by Rollin D. Salisbury.

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Annals, Vol. VIII, Nos. 6-12, Nov., 1895; Memoir I. The Variation of Latitude at New York City, Part I. Declinations and Proper Motions of Fifty-six Stars, by Herman S. Davis, Ph.D.

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Bulletin of the Museum, Vol. VII, 1895.

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Annual Reports of the Trustees of the Association from 1871 to 1894. (Reprinted, 1895.)

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Journal, Vol. 18, 1896, Jan., Mar.

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Third Report to the Board of Managers, by O. F. Cook. 1896.

From the New York Yacht Club, New York :

Report of the America's Cup Committee, Defender-Valkyrie, 1894-95; Report of Regatta Committee, Season 1895; Report of Special Committee on certain Charges made by the Earl of Dunraven, 1896.

From Oberlin College, Oberlin, Ohio :

Laboratory Bulletin, No. 3, Bird Migration at Grinnell, Iowa, and Oberlin, Ohio. By Lynds Jones, Assistant in the Museum; Library Bulletin, Vol. 1, No. 3; The History of Church Music, etc., by Edward Dickinson; Annual Report of the Librarian of Oberlin College for the Year ending Aug. 31, 1895.

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Memoirs, Tome XIX, Nos. 1, 2.

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Bulletin, Nos. 6, 7 (1895).

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Grundzüge der marinen Tiergeographie, Jena, 1896, 8vo.

From the Compagnie Universelle du Canal Maritime de Suez, Paris :

Le Canal de Suez, Bulletin Décadaire, 1895, Dec. 22, 1896, Jan. 2-Mars 12.

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Le Tour du Monde, 1895, Livraison 52; 1896, Livraisons 1-12.

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Carte du Congo Français (2 sheets), avec Notice et Index Alphabétique.

From the Société de Géographie Commerciale, Paris :

Bulletin, Tome XVII, 1895, Fasc. 12; Tome XVIII, 1896, Fasc. 1, 2.

From the Société de Géographie, Paris :

Comptes Rendus, 1895, Nos. 14, 15 et 16; 1896, Nos. 1 et 2.

From the Société de Spéléologie, Paris :

Spelunca. Bulletin, 1^{ère} Année, 1895, Nos. 1, 2, 3.

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Bulletin, 19^e Année, 1895, Nos. 4, 5, 6, Avr.-Mai-Juin; 7, 8, 9, Juil.-Août-Sept.

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Transactions, Vol. XII, Part 1, 82nd Annual Report, etc.

From the Franklin Institute, Philadelphia, Penn. :

Journal, Vol. 141, Nos. 1-4, Jan.-April, 1896.

From the University of Pennsylvania, Philadelphia, Penn. :

Catalogue, 1895-96.

From the Czech Geographical Society, Prague :

Sborník, Vol. II, Nos. 1, 2.

From Elisée Reclus, Author :

Projet de construction d'un Globe Terrestre à l'échelle du Cent-millième. (Bruxelles) 1895, pamphlet, 8vo.

From the Instituto Historico Geographico e Ethnographico do Brazil, Rio de Janeiro :

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Revista, Tomo X, 1-4 Boletins, Anno de 1894.

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Bulletin, Tome XVII, 1895, Nos. 1, 2.

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Bollettino, 1895, Nos. 68-70; 1896, Nos. 71-74.

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Statistica dei Brefotrofi, 1893-1894, Appendice al Movimento dello Stato Civile per l'anno 1894; Annali di Statistica, Fasc. LVIII, Notizie sulle condizioni industriali della Provincia di Modena; Fasc. LIX, Industria della Lana; Atti della commissione per la Statistica Giudiziaria Civile e Penale 1. sessione dell' anno 1895; Società Cooperative di Lavoro fra Braccianti, Muratori ed Affini al 31 Dicembre 1894; Annuario Statistico Italiano, 1895.

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Relazione Statistica intorno ai Servizi Postale e Telegrafico, 1893-94 ed al Servizio delle Casse Postali di Risparmio per l'anno 1893.

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Bollettino, Vol. 8, 1895, Fasc. 12; Vol. 9, 1896, Fasc. 1, 2.

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Bulletin (17^e Année), 1895, Mars-Avr., Mai-Juin, Juil.-Août.

From the Ostschweiz. Geograph.-Commerc. Gesellschaft, St. Gallen :

Mitteilungen, 1896, Heft 1.

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Transactions, Vol. VII, No. 4 (Dec. 1895); No. 5 (Jan. 1896).

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Bulletin, XI, 1894.

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Bulletin, Vol. II, 1895, No. 5; Vol. III, No. 1.

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Bulletin, Vol. 31, Nos. 1, 2, 3; Memoirs, Geographical, Vol. XXIX, Nos. 1, 3, 4; Memoirs, Ethnographical, Vol. XXIV.

From the Salem Public Library, Salem, Mass. :

Trustees' Report, 1895.

From Alberto Sanchez, Author :

La Cornoide. San Salvador, 1895, 8vo.

From the Sierra Club, San Francisco, Cal. :

Bulletin, Vol. 1, No. 6, May, 1895; No. 7, Jan. 1896.

La Gaceta, San José, Costa Rica :

Diario Oficial, Año XVI, Trim. 1, Núms. 1-61; Informe sobre el Camino a Matina y la Costa del Norte, por D. Enrique Cooper; Compendio de las Publicaciones Referentes al proyecto de D. Isidro Levkowicz sobre fundación de la Soc. Mercantil Costarricense y Estatutos de la Misma.

From the Oficina Hidrográfica, Santiago de Chile :

Anuario Hidrográfico de la Marina de Chile, Año 18, 1895; Bibliografía Marítima Chilena (1840-1894) por Nicolas Anrique R.

From the Securities Co., Philadelphia :

New York Securities. A Descriptive and Statistical Manual of the Corporations of New York City and Brooklyn, etc. New York, 1893, 8vo.

From M. T. Singleton, Author :

Gravitation and Cosmological Law. Atlanta, Ga., 1895, pamphlet, 8vo.

From the Bureau de Statistique de la Principauté de Bulgarie, Sophia, Bulgaria :

Mouvement Commercial de la Bulgarie avec les Pays Etrangers, etc., pendant Septembre, Octobre, Novembre, 1895.

From Lehigh University, South Bethlehem, Penn. :

The Educational Value of Engineering Studies. An Address delivered on Founder's Day, Oct. 10, 1895, by Thomas Messinger Drown, Pres.; School of Mechanical Engineering. Under Direction of Prof. J. F. Klein.

From the Swedish Government, Stockholm :

49 Statistical Documents.

From the Geological Survey of New South Wales, Sydney, N. S. W. :

Records, Vol. IV, Part IV, 1895.

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Proceedings, 2nd Series, Vol. X, Part 2, May and June, 1895.

From the Syracuse Central Library, Syracuse, N. Y. :

Annual Report, 1894-95.

From the Société de Géographie de Toulouse, Toulouse :

14 Année-1895-Nos. 3 et 4, 5 et 6.

From the Geographische Gesellschaft, Vienna :

Mittheilungen, Vol. 39, 1896, No. 1.

From the Geological Institute, Vienna :

Verhandlungen, 1895, Nos. 10-17 u. 18.

From the K. und K. Militär-Geograph. Institut, Vienna :

Astronomisch-Geodätische Arbeiten, Band V und VI.

From the American Colonization Society, Washington :

Liberia. Bulletin No. 8, Feb., 1896.

From the Anthropological Society, Washington :

The American Anthropologist, Vols. I-VIII; Vol. IX, Nos. 1, 2, 3, Jan.-Mar., 1896.

From the Bureau of American Republics, Washington :

Monthly Bulletin, for November and December, 1895, January and February, 1896; Annual Report of the Director of the Bureau for the Year 1895; Bulletin No. 60, 1892, Peru. Revised to May 1, 1895.

From the Bureau of Education, Washington :

Report of the Commissioner of Education for the Year 1892-93, 2 vols.; The Science of Nutrition, by Edward Atkinson (2 copies).

From the U. S. Hydrographic Office, Washington :

Charts: No. 1436, N. America, Michigan, St. Mary's River, Hay Lake Channel; No. 1462, Canada, Lake Ontario, Toronto Harbor; No. 1469, Canada, Lake Huron, Georgian Bay, Cabot Head to Boucher Point; No. 1496, Central America, Gulf of Honduras with the Zapotillos Cays; No. 1497, Central America, East Coast of Honduras, Negro Head to Turneffe Cays; No. 1513 (2 in 1), South America, Dutch Guiana, Entrance to Coppermame and Saramacca Rivers—Guiana, Entrance to Corentyn River; No. 1517, Central America, East Coast, Nicaragua, Pearl Cays and Approaches to Pearl Cay Lagoon; No. 1518, S. America, Argentina, Port San Antonio; No. 1519, S. America, Argentina, Rio Negro; No. 1520, S. America, East Coast of Brazil, Port of Camamu; No. 1521, S. America, Argentina, San Blas Harbor; No. 1522, S. America, East Coast of Brazil from Bahia to Ilheos Anchorage; No. 1523, West Indies, S. Coast of Cuba, Port Santa Cruz del Sur; No. 1524, S. America, Brazil, Port Tamandara; No. 1525, S. America, Argentina, Gulf of St. George, Gill Bay, Egg Harbor, and Cayetano Bay and Approaches; No. 1526, S. America, Argentina, Gulf of St. George, Tova Island Anchorages; No. 1527, S. America, Brazil, Port Aracaju (Cotinguiba River); No. 1528, Japan, East Coast of Kiushu, Hososchima Harbor; No. 1529, S. America, Peru, Zorritos Anchorage; No. 1530, Submarine Cables of the World, with Principal Connecting Land Lines, etc.; E., Index to Coast, Special and Harbor Charts, Great Lakes.—Pilot Charts: North Atlantic Ocean, January, February and March, 1896; North Pacific Ocean, January, February, March and April, 1896.—H. O. Publications, No. 96, Edition of 1891, Supplement, 3d Ed. Coast of British Columbia, Juan de Fuca Strait, etc.; No. 105, Edition of 1893, Supplement,

West Coast of Africa from Cape Spartel to Cape Agulhas; Catalogue of Charts, Plans, Sailing Directions and other Publications of the U. S. Hydrographic Office, Jan. 1, 1896; Sailing Directions, No. 108, Part IV, Lake Erie and Lake Ontario, etc.

From the Department of the Interior, Washington :

Report on Crime, Pauperism and Benevolence in the United States at the Eleventh Census 1890, Part II. General Tables.

From the Interstate Commerce Commission, Washington :

Preliminary Report on the Income Account of Railways, June 30, 1895.

From the National Geographic Society, Washington :

National Geographic Magazine, Vol. VII, 1896, Nos. 1, 2, 3.

From the U. S. National Museum, Washington :

Report for 1893; Proceedings, Vol. 17, 1894; Bulletin No. 48; Parts H., I., J. and K. of Bulletin No. 39, Directions for Collecting Minerals, etc.

From the Office of Naval Intelligence, Navy Department, Washington :

Notes on the Year's Naval Progress, July, 1895.

From the Smithsonian Institution, Washington :

Smithsonian Contributions to Knowledge: No. 989, The Composition of Expired Air and its Effects Upon Animal Life, by J. S. Billings, M.D., S. Weir Mitchell, M.D., and D. H. Bergey, M.D. (1895).

From the Department of State, Washington :

Consular Report No. 184, Jan., 1896; History of the Participation of the United States in the Columbian Historical Exposition at Madrid, 1892, by Stephen B. Luce; Report upon the Collections exhibited at the Columbian Historical Exposition at Madrid, 1892, by Daniel G. Brinton; Report of William E. Curtis, Assistant to the Commissioner General, etc., at Madrid, Spain, 1892; Fur Seal Arbitration. Proceedings of the Tribunal of Arbitration at Paris, 1893, Vols. 9-15, and Supplementary Volume.

From the Weather Bureau, Washington :

Monthly Weather Review, August, September and October, 1895.

From the Nassauischer Verein für Naturkunde, Wiesbaden :

Jahrbücher, Jahrgang 48, 1895.

From the Asiatic Society of Japan, Yokohama :

Transactions, Vol. XXIII, December, 1895, and Supplement, December, 1895.

TRANSACTIONS OF THE SOCIETY.

JANUARY-MARCH, 1896.

The Annual Meeting of the Society was held at Chickering Hall, Monday, January 13, 1896, at 8.30 o'clock P.M.

President Daly in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

Hull Fanton. Clarence McK. Lewis. Dr. Franz Boas.

The Annual Report of the Council was then presented and read:

To the American Geographical Society:

The Council respectfully submits the following Report for the year 1895:

The number of Fellows on the 1st of January was 1,228, of whom 295 were Life Fellows. Seventy Fellows were elected during the year. The reductions by death, resignation, etc., were 149, and the whole number of Fellows at the close of the year was 1,149.

The Council has again to congratulate the Society on the condition of its finances. It has received from the executors of the late Vice-President, Maj.-Gen. Geo. W. Cullum, U.S.A., the full amount of the One Hundred Thousand dollars bequeathed in his Will towards providing, in part, for a fire-proof building for the security of the Library and valuable collections of the Society. The Council does not yet find itself, however, in a position to recommend to the Society the acquisition of a site and building for the purposes named in Gen. Cullum's munificent bequest. In the meanwhile the funds are invested in bonds secured by mortgages on real estate in the City of New York and its vicinity, guaranteed by Trust Companies, in whose solvency the Council has full confidence.

The accumulation of interest on the Cullum Geographical Medal Fund will, it is anticipated, soon justify the Council in entering upon the preparation of a design for the medal and proceeding to make the award.

The modifications in the manner of publication of the Bulletin have been, it is believed, for the better, and the suppression of the Supplement formerly issued as a separate number (No. 4. Part 2), has met with general approbation.

Towards the end of the year the public interest in the disputed boundary between British Guiana and Venezuela brought an unusual number of visitors to the rooms of the Society, for the purpose of consulting maps and atlases, of which our collection is very full and rich. This number of visitors has emphasized the need for increased accommodation, and it is hoped that the Society may soon be placed, by the generosity of friends, in a position to take steps towards the acquisition of a fire-proof building of ample size, worthy of the American Geographical Society.

In reviewing the work of the past year the Council dwells with peculiar satisfaction upon its prompt initiative in calling the attention of the American public to the necessity of despatching a vessel to Greenland to rescue the heroic Peary and his companions from what proved to be a position of the most imminent peril. The matter attracted the attention of the American Museum of Natural History and its friends and particularly its President, Mr. Morris K. Jesup, who generously fur-

nished the main part of the necessary funds and also relieved Mrs. Peary and Mr. Diebitsch of much of the labor and care of organizing the expedition.

The additions to the Library number 2,896, viz.: Books 514, Pamphlets and Periodicals 2,215, Atlases 24, Maps and Charts 143.

The cash balance in the hands of the Treasurer on the 31st of December was \$14,069.49, as appears by his report, herewith submitted.

All of which is respectfully submitted.

(Signed) HENRY PARISH,
Chairman.

New York, Jan'y 4, 1896.

The Report of the Treasurer was then presented and read:

REPORT OF THE TREASURER FOR THE YEAR 1895.

NEW YORK, January 1, 1896.

To the American Geographical Society:

The Treasurer respectfully reports the following Receipts and Expenditures of the Society for the year ending December 31, 1895:

The balance in the Union Trust Co., January 1, 1895, was... \$3,767.70

The Receipts have been:

Dues.....	\$9,020.00	
Interest.....	5,975.01	
Sale of Publications.....	119.50	
Miscellaneous.....	9.70	
		<u>15,124.21</u>
		\$18,891.91

There have also been received:

From the Estate of Gen. Cullum.....	100,000.00	
From Title Guarantee and Trust Co., mortgage investment paid off.....	1,500.00	
From U. S. Mortgage Co., withdrawal of deposits.....	34,750.00	
And Interest on the Cullum Medal Fund..	164.66	
		<u>136,414.66</u>
		155,306.57

The Expenditures have been:

House account.....	509.80
Salaries.....	4,974.00
Library.....	1,488.49
Lectures.....	930.67
Publications.....	2,052.49
Stationery and postages.....	461.05
Insurance.....	217.88
Exploration account.....	1,000.00
Miscellaneous.....	52.70

There has also been paid for guaranteed mortgages on property in New York City and its vicinity..... 129,550.00

There remains on deposit in Union Trust Co. January 1, 1896..... 14,069.49

155,306.57

(Signed) WALTER R. T. JONES,
Treasurer.

The Committee charged with the duty of selecting candidates for the offices to be filled reported the following:

REPORT OF THE NOMINATING COMMITTEE FOR 1896:

To the American Geographical Society:

The Committee appointed by the Council December 7, 1895, to nominate suitable persons to fill the offices which become vacant in January, 1896, respectfully recommend the election of the following gentlemen:

For President—CHAS. P. DALY, LL.D., term to expire January, 1897.

For Vice-President—REV. C. C. TIFFANY, D.D., term to expire January, 1899.

For Treasurer—WALTER R. T. JONES, term to expire January, 1897.

For Domestic Corresponding Secretary—

JAMES M. BAILEY, term to expire January, 1899.

For Councillors—REAR-ADM. BANCROFT GHERARDI, U. S. N.,

WILLIAM G. HAMILTON,

HENRY HOLT,

CLARENCE KING,

CHARLES A. PEABODY,

Terms to expire January, 1899.

(Signed) CHANDLER ROBBINS, *Chairman*,
LEVI HOLBROOK,
FRANCIS M. BACON,

Nominating Committee.

On motion, duly seconded, Mr. Banyer Clarkson was authorized to cast the vote of the Society for the candidates, and they were declared duly elected.

The President then introduced the speaker of the evening, Mr. Cyrus C. Adams, who delivered a lecture on Progress in Africa.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Chickering Hall on Monday, February 10, 1896, at 8.30 o'clock P.M.

President Daly in the chair.

The following persons, recommended by the Council, were elected Fellows of the Society:

James Owen, C.E.

Thos. F. Burgess.

Henry Hartley, M.D., Vicksburg, Miss.

The President then introduced the speaker of the evening, Civil Engineer R. E. Peary, U.S.N., who addressed the Society on his Work in North Greenland in 1894 and 1895.

On motion, the Society adjourned.

A Regular Meeting of the Society was held at Chickering Hall, on Monday, March 9, 1896, at 8.30 o'clock P.M.

President Daly in the chair.

The President introduced the speaker of the evening, Prof. T. C. Mendenhall, late Superintendent of the U. S. Coast and Geodetic Survey, who addressed the Society on the Alaska Boundary Question.

On motion, the Society adjourned.

A Special Meeting of the Society was held at Chickering Hall, on Tuesday, March 24, 1896, at 8.30 o'clock P.M.

President Daly in the chair.

The following person, recommended by the Council, was elected a Fellow of the Society:

Edward F. Farquhar.

The President then introduced the speaker of the evening, Mr. C. E. Borchgrevink, who addressed the Society on the First Landing on the Antarctic Continent, its Results and the Coming Expedition.

On motion, the Society adjourned.